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SEPTEMBER 1986 $2.95 $3.50 CDN
THE HOME SATELLITE TELEVISION MAGAZINE™
ZONING VICTORY IN HISTORIC DISTRICT
VIDEOCIPHER COMPATIBLE RECEIVERS
PRODUCT REVIEWS:
SERVO MASTER II POLARIZATION CONTROL SYSTEM
DRAKE 924i RECEIVER
0 70989 37791 09

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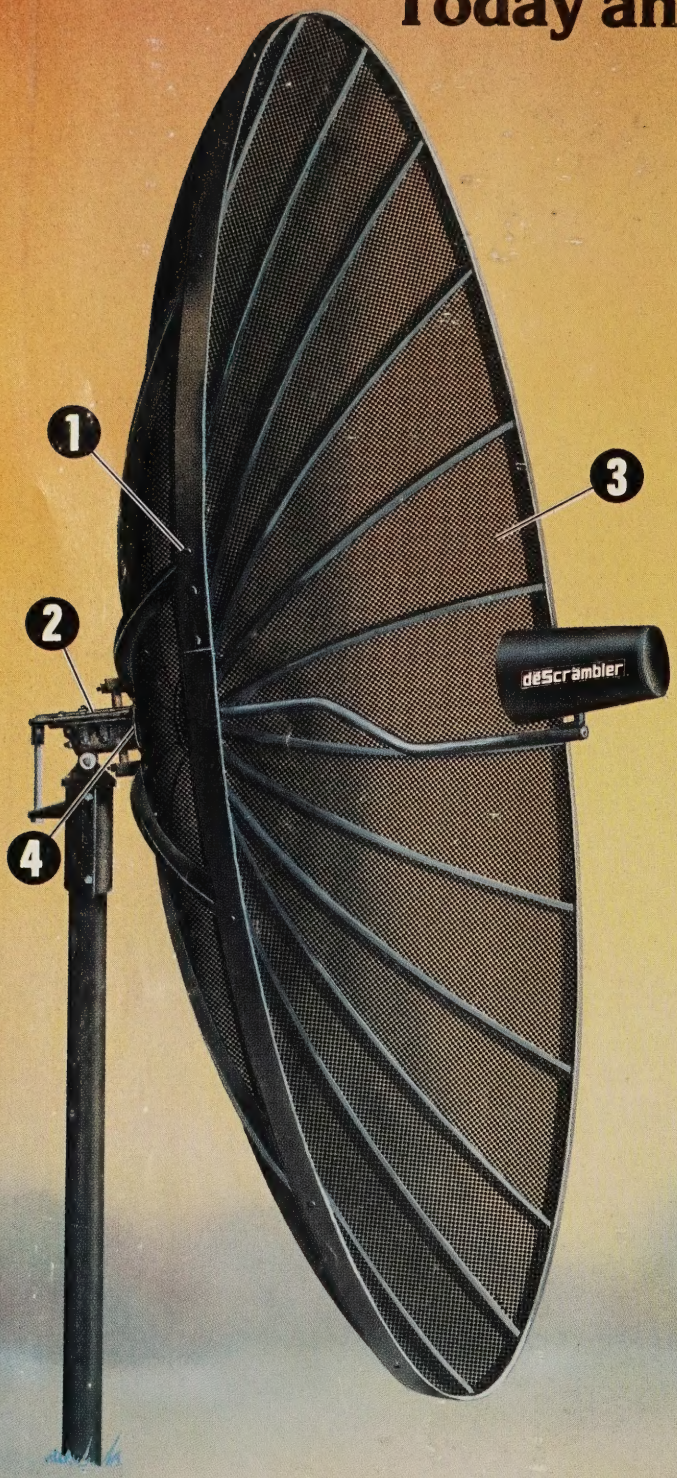

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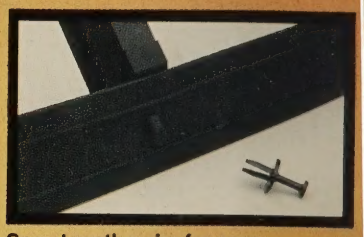

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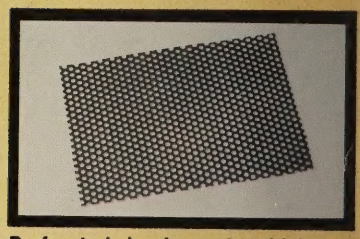

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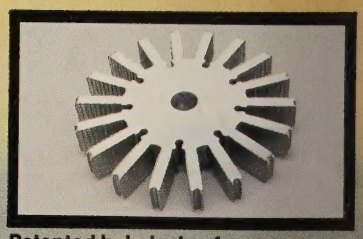

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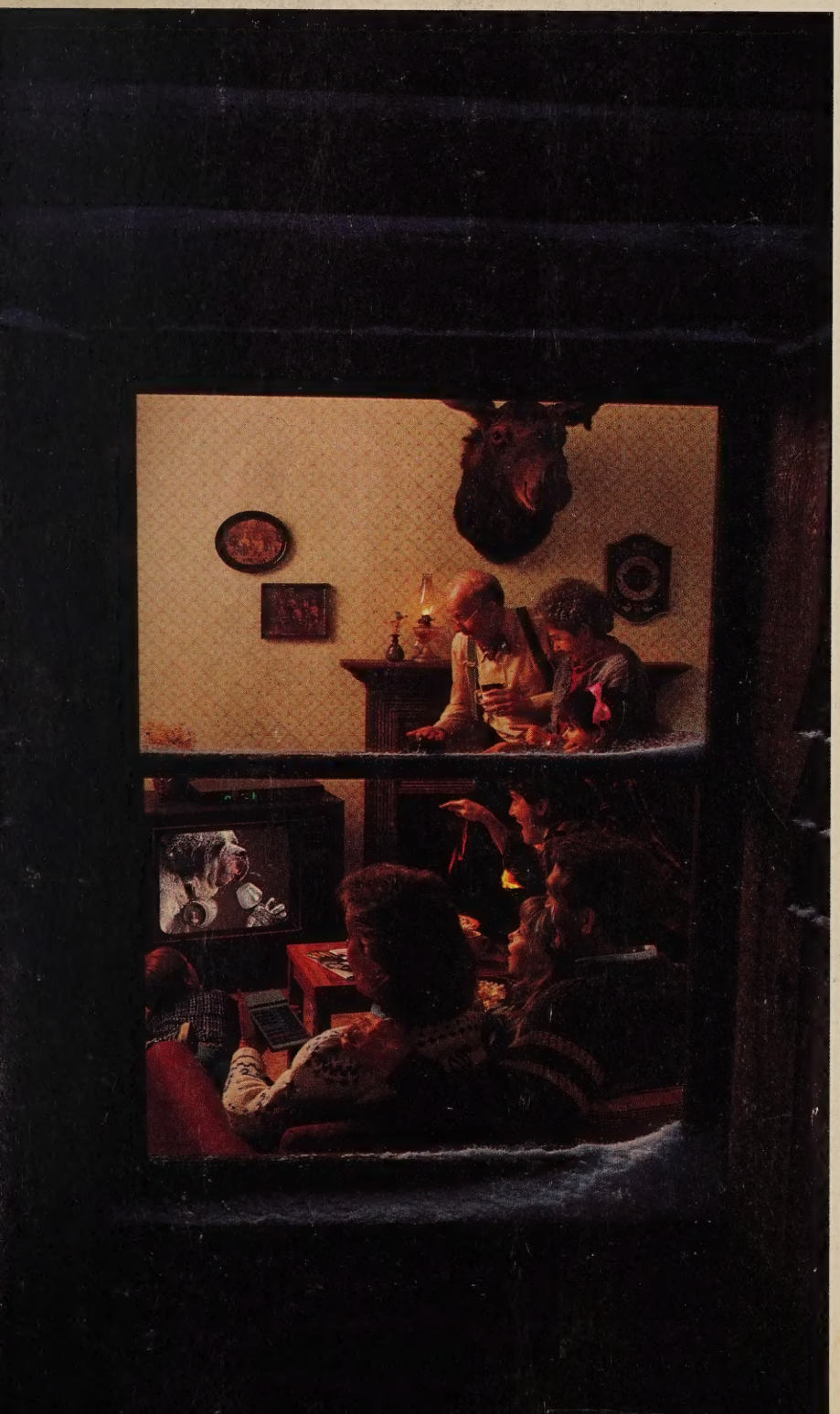

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"I highly recommend . . ." *Richard Sinervo, Satellite Opportunities Magazine, April 1985*

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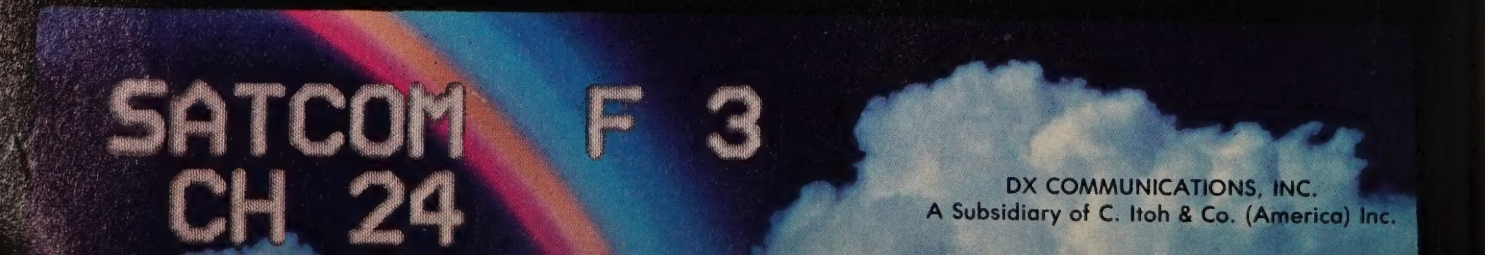
DX ANTENNA



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STV®

THE HOME SATELLITE TELEVISION MAGAZINE™

About our cover: The Vermont countryside provides a scenic backdrop for this dish, owned by Harris Peeler, a winner in the STV Beautiful Dish Contest.

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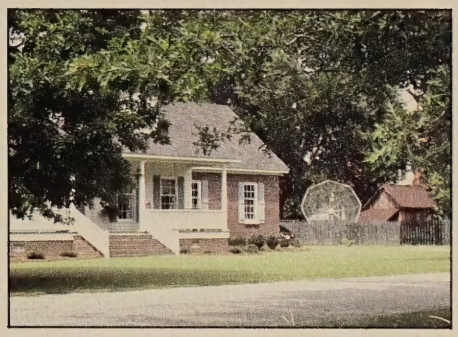

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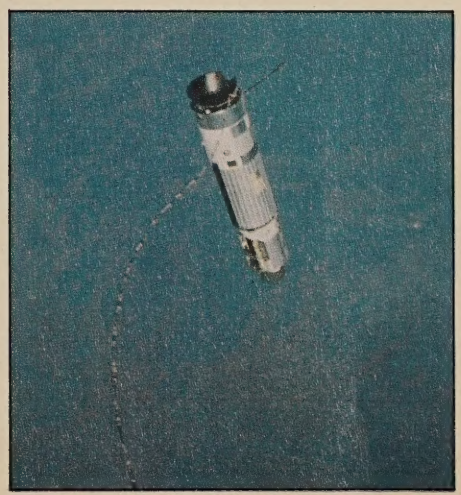

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Editor's Corner

by Pat St. Charles

Captain Midnight Captured!

In contrast to Clark Kent, who always dashed into a telephone booth to change into Superman before rushing to a rescue, the self-proclaimed crusader for the viewing rights of home satellite owners was captured as a result of a conversation overheard in a telephone booth.

Three months of intensive investigation by the Federal Communications Commission (FCC) has resulted in the identification and arrest of the elusive Captain Midnight. John R. MacDougall, an uplink operator for the Central Florida Teleport in Ocala, Florida, has been charged with "illegally operating a satellite uplink transmitter to intentionally cause interference to the satellite cable television programming of Home Box Office, Inc. (HBO)."

HBO's programming was interrupted on two occasions, on April 20 and again on April 27, 1986. The initial interruption lasted approximately three minutes and consisted of a color bar pattern which overrode the HBO signal. A week later, just as HBO was starting "The Falcon and the Snowman," their signal was again interrupted for four and a half minutes by a color bar pattern with the following message superimposed:

GOODEVENING HBO
FROM CAPTAIN MIDNIGHT
$12.95/MONTH ?
NO WAY !
(SHOWTIME/MOVIE CHANNEL BEWARE!)

During their investigation, the FCC narrowed from 580 to less than 12 the number of licensed satellite uplink facilities with the necessary equipment to accomplish such a deed. Although it was originally reported that anyone with a back yard satellite antenna could do such a thing, it was quickly learned that it would require the facilities of a commercial uplink station. A particular type of character generator (to produce the message) and an antenna of at least seven meters were required. Both of these items were found at the Central Florida Teleport at Ocala.

MacDougall, owner and president of MacDougall Electronics, a satellite dealership, worked on a contract basis for Central Florida Teleport. At both times HBO's signal was intercepted, MacDougall was the operator on duty. Scheduled programming had ended at the times in question, making the facility available for this type of interference.

For some time, it was thought that Captain Midnight had operated out of a facility located in Texas. A confidential source who overheard a conversation in a telephone booth regarding Captain Midnight was instrumental in leading the FCC to the Ocala area.

Lauded by some members of the satellite television community for his actions, and condemned by most members for reinforcing a piracy image of the satellite industry, the notorious Captain has entered a plea bargain which will result in a one year probation and $5,000 fine.

Pat St Charles

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California Amplifier is proud of its products and customers. OEM customers include such highly respected companies as: *Chaparral, Channel Master, DX Communications, Houston Tracker, Janeil, Pico, Radio Shack and Winegard.* Their distributor network is represented throughout the United States and internationally.

OEM, Distributors, Dealers and End Users have found a unique comfort in working with **Cal Amp** because of its strong engineering background. The company is one of a very few manufacturers still researching and designing new products for the existing C Band and emerging Ku Band marketplace. Revolutionary new products will soon be announced incorporating both C and Ku in a single boresight. Other products include development of Ku splitters and accessories for the European market.

California Amplifier is currently building the Masterfeed Dual, a product which incorporates a dual feed and two LNB's designated for horizontal and vertical polarization. This one compact housing allows the consumer to receive both signals for 24 channel viewing on multiple receivers and saves additional time and labor during installation. Performance temperatures range from 55 to 85 degree Kelvin and units have been tested with exceptional results throughout the United States.

A new concept has evolved which will allow Ku to be added to a C Band Masterfeed Dual or Masterfeed Single as a retrofit sale. Certainly this is useful for today's marketplace.

The Dual Polarity Switch is designed for receivers that don't have built-in switching capabilities, and is still a popular accessory item for the TVRO industry. DC blocks, power dividers, coax relays and long runs of expensive cable are all eliminated by installation of this product—creating higher dealer profit on every multiple receiver system installed.

California Amplifier continues to produce its 55 degree K Low Noise Amplifiers (LNA) with the self diagnostic LED. The high and low frequency LNB's for C Band will soon be joined by CKu LNB's developed for use in both the U.S. and Europe.

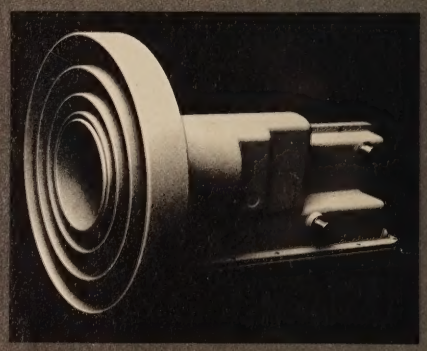
In an industry riddled with anxiety, it's a comfort to deal with a company on which you can depend. With many temptations to be pulled into manufacturing other products, **California Amplifier** has stayed with their successful amplifier line and accessories. Continuously improving old products and developing exciting new products—it's easy to see why **California Amplifier** is still the Leader in TVRO!

MASTERFEED-DUAL™

MODEL NO. CDF42156B **950-1450 MHz IF**

Specifications

Input Frequency	3.7 to 4.2 GHz
Output Frequency	950 to 1450 MHz
Noise Temperature @ 25°C	55°, 60°, 65°, 70°, 75°K
Gain	65 dB Typical, 62 dB min., 70 dB max.
Gain Slope	1450 MHz to have 0 to 4 dB more gain than 950 MHz spread linearly across entire band
Input V.S.W.R.	3.0:1 Typical, 50 ohm sys.
Output V.S.W.R.	2.0:1 Typical, 75 ohm sys.
1 dB Compression Point	+ 5 dbm min.
3rd O.I.P.	+ 16 dbm min.
L.O. Frequency	5.150 GHz
Frequency Stability	
Local Oscillator	± 2.0 MHz -30°C to +60°C
D.C. Power:	
Voltage	+15 to +28 VDC
Current	250 mA max.
Feed	Through either output connectors
Temperature Limits:	
Operating	-40°C to +70°C
Storage	-65°C to +85°C
Interface Output	75 ohm Type F, 2 outputs
Input	Circular waveguide horn
Cross Polarization Isolation	18 dB min. across 30° skew range
Weatherized Housing	Yes
Dimensions:	
Size	9.76" x 2.78" x 3.74"
Weight	1.850 lbs.
Scalar Dimensions:	
Size	6.45" outside diameter 2.63" inside diameter
Weight	0.90 lbs.
Powered Up Burn In (to weed out any weak components that might lead to early failure)	Heated to 66°C (152°F) for 6 hours
Special "O" Ring Sealing	Yes



Description

The California Amplifier MASTERFEED-DUAL™ incorporates the latest technology in feedhorn and amplifier design. This new state-of-the-art DLNBF operates with most block down conversion receivers from 430 to 930 MHz and 950 to 1450 MHz. Combining two LNB's and feedhorn in one compact housing, the MASTERFEED-DUAL™ allows you to receive both horizontal and vertical signals for 24 channel viewing on two receivers, eliminating the need for a dual feedhorn, two separate LNB's and the additional time and labor when installing a multiple receiver system. Some of the new features of this DLNBF are: a very stable frequency output controlled by the latest dielectric resonating oscillator, complete filtering of unwanted signals outside of the operating band using high quality, low loss microstrip filters. Reliability is greatly increased with automated assembly.

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The Canadian Scene

by Bill Barr

CRTC Sets New DTH Policy

The Canadian Radio-Television and Telecommunications Commission issued a public notice (CRTC 1986-136) asking for submissions to enable it to formulate a policy to regulate Direct to Home (DTH) broadcasting via satellite.

The notice states, "In order to assist interested parties, who may be developing plans for DTH services, this notice outlines the general regulatory approach the commission intends to use with regard to DTH services to be sold to individual homes and invites comments on the regulatory treatment to be accorded to such a service."

The CRTC directive states that it intends to regulate scrambled DTH satellite transmissions similar to the way it now oversees cable and pay-TV broadcast operations. Scrambled DTH programmers will require a license. Canadian content will be dictated, and subscriber fees must be submitted to the commission for approval or increase. Existing DTH programmers such as Cancom, plus future DTH services now on the drawing board from FirstChoice and Telesat, will be governed by the new policy.

The CRTC directive concerning unscrambled DTH services is similar to the present policy applied to radio and TV broadcasters. A license is required; programming and commercial content is controlled.

Traditionally requests for submissions by the CRTC are answered by broadcast, cable, cultural, or art groups. The new DTH policy is very important to the home dish owner. It will determine the type of programming available in Canada via satellite, foreign or domestic, and who will have access to it and at what price.

To ensure that home TVRO access rights are presented, the Satellite Communication Association of Canada (SCAC) formed a task force under vice-chairman Ivan Murdinic. He will present a submission to the CRTC on SCAC's DTH position.

Tee-Comm And Banvil Merge

On July 7, 1986, Tee-Comm Electronics of Montreal acquired Banvil, Ltd., a large Canadian distributor with four locations coast-to-coast. Banvil reported sales of 16 million with net earnings of $658,000 in 1985. Tee-Comm reported sales for the six months ending May 31, 1986, of $1,488,000 and a net loss of $157,000, which represents a loss of $.04 per common share.

This is the second acquisition by Tee-Comm this year. On April 17, they purchased Hero Communications, a Florida based antenna manufacturer. Hero specializes in international communications and produces antennas in various sizes up to 33 feet.

Other Canadian distributors were astounded at the Banvil/Tee-Comm merger. Most were at a loss to explain the impact it will have on the Canadian TVRO retail marketplace. Evan Sherris of Cale Communications said, "Oscar Steiner (CEO of Tee-Com) approached me about a merger several months ago. I failed to see what either company could gain from such a move; therefore, we never got past the initial discussion phase. I guess Banvil sees some benefit I missed."

The merger occurred during a period of uncertainty in the TVRO industry, caused by HBO and others scrambling. However, the principles of Tee-Comm and Banvil expressed optimism for the TVRO industry in Canada at the merger announcement.

Marcel Masse Departs As Communications Minister

Prime Minister Mulroney shuffled his cabinet in early July and moved Marcel Masse from communications to energy. The new communications minister is Flora MacDonald, MP for Kingston and the Islands.

In the two years Masse ran communications, little changed. Masse concentrated his efforts on the arts and publishing groups. Budget cuts forced these parties to operate on less government dependence. Masse cut the Canadian Broadcasting Corporation (CBC) budget by $200 million. This resulted in less Canadian program production, the shortfall was filled by foreign product. Masse was an outspoken nationalist on communications issues. Like his predecessor, Francis Fox, he believed Canada should be a net exporter of TV programming and films. Reality proved this was only a dream that could never come true.

Little is known of MacDonald's position on communications issues. Like Masse, she also has nationalistic leanings, having been a founding member of The Committee for an Independent Canada. This group strives to rid Canada of foreign economic dominance. Because of this we can assume that certain US pay programming will continue to be excluded from Canada, protecting the local product.

MacDonald can operate in morse code, she learned this at an early age in her father's telegraph office. She also likes chocolate chip cookies. When Air Canada stopped supplying the cookies with coffee on their flights, she complained and had the cookies reinstated.

Like all new ministers, MacDonald will enjoy a honeymoon period, then the sparks will fly. The communications portfolio is regarded as one of the toughest jobs in the Canadian government. Former communications ministers liken the position to a high-wire act, one slip and you are in deep water.

The Canadian satellite industry is now mobilized and very active politically. Already groups such as the Condominium Association of Canada, The Consumers Association of Canada, and SCAC are planning a letter assault on the new minister. Brian Dinsdale, chairman of SCAC, said in his introductory letter to MacDonald, "We now have 170,000 satellite systems operating in Canada and employ 4,000 people. If we do not get satisfaction from your government, we will turn the 170,000 into votes against your party in the next election." ■

And Now A Few Words About... by Mike L. Gustafson

Satellite Launch Systems

Got a few hundred million you want to invest? Now is the time to get into the heavy launch vehicle business. With the failure of both the space shuttle and the Delta rocket programs, the US space program is at a standstill. At about the same time the US was having launch problems, the Ariane V18 launch system had its fourth failure out of 18 launches. The loss of the Ariane, which is Europe's only heavy launch program, leaves only the USSR and China with operating space programs. The Chinese launch system is of yet untested with anything but sandbags.

The point is, with most of the Western launch capability currently on hold, all those satellites, both military and commercial, are looking for a way into orbit. Russia has opened negotiations with a few satellite owners to start taking our hard earned dollars in return for throwing a few satellites into orbit. The owners of Westar 6 and Palapa have signed a tentative agreement with China to have them handle the launch, just as soon as they are ready.

Satellites that were supposed to be launched this year are probably not going to make it into orbit for another two years. That makes all the satellites in orbit a whole lot more valuable now than they were six months ago. Rumor has it that the US is down to one really good low orbit satellite that can be used for early launch verification of offensive weapons. That's a nice way of saying a spy satellite. More importantly, the TDRS satellite system which was to be used by the shuttle program is in real trouble. The one in orbit is about out of station keeping fuel, and the replacement was lost along with 51-L, the shuttle accident. I suppose as long as the shuttle is grounded we don't need a communications satellite for it, but when the program gets back on its feet we will need it in a bad way.

As a pilot, the loss of the Western world's launch systems has spelled a real hardship. The weather satellite system, GOES, is limping along with minimal coverage over the east and west coasts. What that means is boaters and pilots are working in the blind. The weather people can't see what is coming so they can't give very accurate forecasts. The GOES satellites will be ready to launch, but there won't be a vehicle to do the launching in the near future.

If all that wasn't enough to make you turn in your Klingon decoder ring, the insurance underwriters who bet on the successful outcome of a satellite launch are tired of losing their shirts and have pulled all insurance on future launches. Unless there is a change in policy, satellite owners will have to self-insure. What that means is bite the bullet and hurl that 35 to 50 million dollar ball of electronics into orbit with no financial parachute. If a small satellite owner were to lose a satellite, the company would most likely go out of business. I wonder how long stockholders are going to go along with that plan. They will probably invest in some other less risky business.

The GOES satellites will be ready to launch, but there won't be a vehicle to do the launching in the near future.

Let's get down to how all this launch business is going to affect the home earth station business. For starters, the current glut of spare transponders will disappear faster than your banker's heart when you ask him for a loan! Companies that were only thinking about using a satellite-based distribution system will rush out and buy a channel or two just to have in their back-pocket. And since the majority of the new transponder owners are in the data business, you won't see video on those channels.

The new video services will find the cost of uplink and transponder time to be more expensive than they had planned. That means in order to secure venture capital, the new services will have to turn a profit sooner to keep the investors happy. As has been the case with most of the existing video services, turning a profit has eluded them for years. So where does that leave the start-up services that could be friendly towards the home earth station market? Out in left field, unfortunately. With our current attitude about paying for the video software, a new movie service will probably not see the light of a picture tube.

The last list I saw of future video services was quite long with at least 20 names set to go on the air over the next two years. I would hazard a guess that most will die in the planning stage due to the high cost of software and satellite time.

Ku-band Direct Broadcast Services are not in any better shape. What you see is what you get. The lack of launch services will keep all of the high powered satellites in the barn. The 1 foot antenna systems are still many years away from reality. All of the C-band problems apply to Ku-band, but are magnified because there are so few of the Ku satellites in orbit. If you check out each of the Ku satellites in orbit, you soon notice most are running data, not video. No new satellites coming into orbit means no new video services after the transponder glut is over.

This is not meant to be a doom and gloom column. I don't expect the crunch to begin for a year or two. The existing services will not go away, and a few hearty souls will find their way up on the satellite arc with new services. But until the heavy launch systems of either the US or Europe are put back on the air and are successfully hurling aluminum into orbit, the cost of video services will go up.

No, I still say it is a prime time for a private space venture to get off the ground, so to speak. Yes, I know it is true that the last two private operations met with failure, but maybe the third time is the charm. I might be willing to invest a few bucks, how about you? ■

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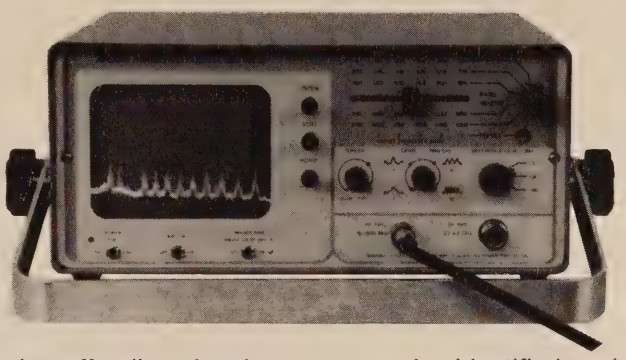

With AVCOM's PSA-35 Portable Spectrum Analyzer you can measure and document TVRO system performance after installation or service. Troubleshoot system problems by observing output signals from LNA's, BDC's, Line Amps and Splitters, and other RF signal components. Measure block system signal balance.

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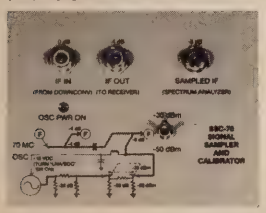

If Terrestrial Interference filters are in the IF coax line, they can be tuned precisely so that video quality is preserved while T.I. is minimized.

Also an internal oscillator operating at 70 MHz, with harmonics at 140 MHz and beyond provides a quick means of checking amplitude calibration and frequency setting of the PSA-35 Spectrum Analyzer. Two output signal amplitude settings are available, one at -30 dBm and another at -50 dBm (at 70 MHz). The output level is selected by a front panel switch. The calibration oscillator is powered by the PSA-35 LNA/BDC power through the input connector. A front panel LED indicates when the oscillator is on.

TISH-40 TERRESTRIAL INTERFERENCE SURVEY HORN — AVCOM's new Terrestrial Interference Survey Horn, TISH-40, is designed to be used in conjunction with the PSA-35 Portable Spectrum Analyzer for site surveys.

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Spacewatch

by Jeffrey Manber

Satellite Launch Systems

How should the donations from the American public, given in memory of the ill-fated Challenger crew, be spent?

That is the question confronting the families of the Challenger crew and the many organizations which established memorial funds in the days and months after the January 28 accident.

The major problem for space agency officials was the sheer number of funds which were established. Dozens of organizations, some in Washington, New York, Houston, and in Florida, as well as several in Europe, were set up to handle the outpouring of support from the public. STV was one magazine which freely donated editorial space to advertise a shuttle memorial fund. Now, half a year later, the families of the Challenger are emotionally prepared to sit down and discuss the creation of a special tribute.

Let me quickly state that I am not leading up to some horror story regarding the fate of donations that you may have mailed in to an organization. Not a single case of fraudulent use has surfaced I'm happy to report. Rather, the problem is how to bring together the many organizations and what to do with the funds once the organizations are brought together.

One tribute that has been discussed has been the creation of a monument at the Kennedy Space Center. This monument would be dedicated to the crew of the Challenger and to all the astronauts who have lost their lives while connected with the space program. This includes the three who died in the Apollo fire, and also several astronauts in training who were involved in fatal accidents. This monument was proposed by Senator Jake Garn and Congressman Bill Nelson, both of whom have flown on shuttle missions.

In Houston, it has been assumed that a similar sort of monument would be constructed at the Johnson Space Center. Astronauts live in Houston, and the local space community is intent on not only remembering the crew, but to do so in a style that would further the efforts to educate the public on the American space program, which was the chief goal of 51-L.

One suggestion that is gaining support is an entirely new sort of memorial. Rather than constructing some sort of statue, the space community is proposing the creation of an educational institute, whose sole goal would be to provide a mechanism through which teachers could be taught how to educate children about space.

The center, as now envisioned, might also create scholarships for young space researchers on the high school and college levels.

For those who believe that the future of our commitment to space lies with the children of today, I think an educational center for space programs is a fitting and constructive memorial.

As this column is being written, the plans for the center are still being drawn up. A board of directors already includes well-known names from the political, educational, and business communities. The Challenger families have been informed of the proposal and they are, I'm told, in favor of the idea. The next step involves a public announcement and some sort of coordination of all the funds already in place.

For those who believe that the future of our commitment to space lies with the children of today, I think an educational center for space programs is a fitting and constructive memorial. As this column is being written, the plans for the center are still being drawn up. A board of directors already includes well-known names from the political, educational, and business communities. The Challenger families have been informed of the proposal and they are, I'm told, in favor of the idea. The next step involves a public announcement and some sort of coordination of all the funds already in place.

In recent months, I've looked at the impact of the grounding of both the American space program and the European Ariane program on the satellite communications industry. The impact, of course, continues to be felt, and some major US corporations may be dramatically affected if their satellites continue to be stuck on the ground.

What the entire situation reveals is the dire need for a well-planned space policy, one which involves close cooperation with other space programs, and with the needs of the customer.

President Mitterand of France has just called on the US to sit down with France and plan some sort of mutual program for deployment of commercial communications satellites. The problem transcends national competition, and a realistic approach would be good news for all connected with the industry—the manufacturers, the owners, and the users of communication satellites. ■

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SPOT: The New French Remote Sensing Satellite

by Peter J. Brown

The Systeme Probatoire d'Observation de la Terre, or SPOT, may well be the most controversial satellite system since Sputnik. Launched in February by the French firm, Spot Image SA, at the European Space Agency facility in French Guiana, SPOT is a revolutionary civilian remote sensing platform. It far exceeds the capabilities of its only competitor, Landsat, which is operated by a Hughes Aircraft-RCA joint venture called Earth Observation Satellite Co. (EOSAT). SPOT may not be as powerful in terms of image resolution as our military intelligence satellites, the KH-11's or the soon-to-be KH-12's, but it has certainly closed the gap between military and civilian systems.

SPOT is in a sunsynchronous orbit. (After having been activated 36 hours after launch, SPOT settled into a slot 517 miles out.) It races around the Earth so that the sun's rays are kept at a uniform level of illumination, reducing glare and eliminating the spectral distortion caused by light reflected off large bodies of water. SPOT takes about 101 minutes to circle the Earth with its twin high resolution visible instruments or image recorders scanning a 600-mile wide path across the Earth's surface. It is a revolutionary system not only because it captures images with up to 10 meter (33-feet) resolution, but because it can monitor any one point at least twice a week. Landsat could hit any one point only once every two weeks.

SPOT passes directly over the same point every 26 days; however, because it contains a mechanical plane mirror, it can scan out from side to side, exhibiting what is called off-nadir viewing. This allows SPOT substantial flexibility. After passing over Point A, 24 hours and 14 revolutions later, SPOT will pass over a point five tracks to the east of Point A. Some five days later, SPOT will pass over a point which is one track to the west of Point A. With its mirror system, and a set of instructions from its base in Toulouse, France, SPOT will not only be able to offer multiple images of the same location, but it generates 3-D or stereoscopic images. (It should be pointed out that SPOT more often approaches those places which are at 45-degrees latitude, than those points along the equator. The former can be monitored about 11 times over a 26-day period, while the latter will only be covered about seven times.) This ability to peer over from another track helps overcome the problem of cloud cover.

SPOT plunges us into the era of open skies. Its images or pictures cost more than Landsat's, but they are still surprisingly cheap, given the fact that the satellite itself cost about $300 million to construct. For a mere $155, you can have a black-and-white print, while a top-priced color transparency will cost about $1790. The prices and products may inevitably change as SPOT's range of services is expanded and/or modified. SPOT is designed to serve geologists, crop forecasters, forestry experts, civil and environmental engineers, and urban planners, to name a few. Bold and innovative applications will certainly evolve as this technology becomes more widely used.

France's entry into the remote sensing market is likely to draw others. There is a growing list of nations which are actively pursuing SPOT-like developments. The definite prospects now include Japan, the European Space Agency, West Germany, and perhaps even Canada. While private firms in the US may also enter the market, perhaps the biggest surprise would be a Soviet venture, although there is no current indication that any true commercial enterprise is being planned there.

With its HRV's, the elaborate detector devices, SPOT is an extremely sophisticated eye in the sky. It sends out a stream of data which can be processed in a number of ways. It is this broad data stream which provides potential customers with a comprehensive selection of images, in the raw or precision processed form.

Back here on Earth, an extensive network of direct readout earth stations is slowly taking shape. Using X-band telemetry (6.2 to 10.9 gHz), SPOT will feed facilities in France, Sweden, Canada, and Bangladesh. The future holds unlimited possibilities. China, India, and Saudi Arabia have stations under development while six more countries are not so far along in their planning. Spot Image executives are anxious to enlist any nation which is capable of operating such a facility.

SPOT is obviously controversial. It offers private citizens and less-developed countries access to a technology which was once the prized possession of a few advanced nations. Secret military operations and sensitive activities of any kind will no longer enjoy their former status. Government officials may not be able to monopolize the interpretation of factual accounts based on satellite surveillance. Consider the current debate over the SALT Treaty and alleged Soviet violations. SPOT opens the door to non-governmental evidence that ABM sites, etc. are under construction. This is one dimension. There is also the potential impact of SPOT on the debate over American MIA's in Southeast Asia. The list goes on and on.

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This subscene, showing the city of Montreal, was acquired by the SPOT 1 satellite on February 27, 1986. The airport, train station and city streets all appear clearly in the image, as well as the ice flow in the St. Lawrence River.

staple for the evening news. The media was quick to embrace SPOT during the Chernobyl incident, but it is important to remember that the leap from Landsat to SPOT is only the beginning. The next generation of remote sensing platforms may outperform SPOT. Thus, the technology itself is going to force us to change, and SPOT's impact could be substantial. Now that the skies have begun to open, the chance that they will ever close seems unlikely. This is certainly one SPOT which is not going to disappear for quite a while. ■

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For the full story, contact: Panasonic Industrial Company, Video Communications Division, One Panasonic Way, Secaucus, NJ 07094. (201) 392-4804.

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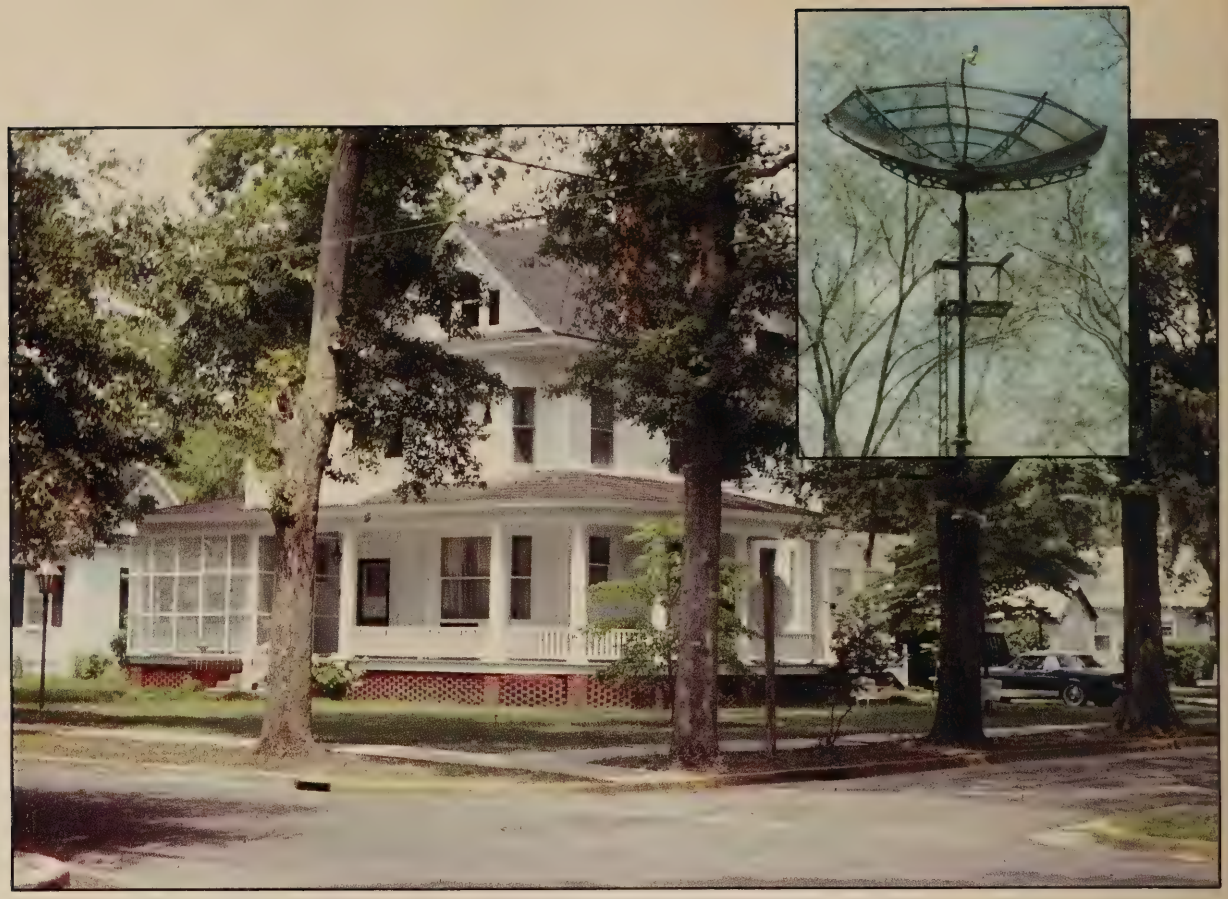

Cooke Brews A Stew

by Mike Stevens

Marion, South Carolina...a perfect place to settle down and raise a family. It's a small community some 45 miles from famous Myrtle Beach. Tourists frequently stop in Marion for the purpose of soaking up some of the local charm. The streets are lined with beautiful oak trees draped with Spanish moss. The community has, for a number of years, been designated as an official 'tree city' by the United States Forestry Service. Marion is steeped in a rich history with the name of the town honoring its native son, revolutionary war hero Francis Marion...better known to the Torries as "The Swamp Fox." It is slow-paced with friendly residents who are always willing to stop and chat with tourists, and if you ask, they will be delighted to show-off their many antebellum homes. For a small southern community of about 10,000 people, it is probably one of the most culturally advanced locations in the United States with numerous musical and theater productions taking place year round. You couldn't ask for a better environment to enjoy an easy-going lifestyle. But try to install a satellite dish in your own backyard, and the revolution can be found again. At least that would have been the case until David Cooke, a lifelong Marion resident, decided he wanted a satellite system.

David Cooke owns a beautiful old southern home geographically located in the center of the town's Historic District. David, like many other Americans, evaluated the monthly fee he was paying for cable along with the limited choice of viewing and decided, "a dish was the way to go." He contacted several dealers in the area to survey his property for a dish location.

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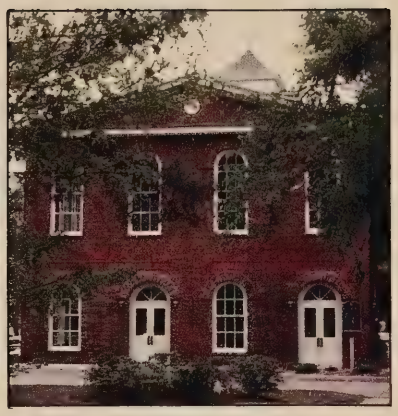
to evaluate the site. Dan Farrow, who is a full-time Guidance Counselor for the Marion County Vocational School, agreed to take a look. Farrow has considerable knowledge of TVRO and has been an amateur radio operator for years. He agreed with Cooke that the situation was difficult, but not impossible. The microwave problem could possibly be solved with a filter. Some trees would have to be trimmed, and the dish elevated in excess of 20 feet. Not impossible, but certainly difficult and expensive.

The next step was to contact the local building inspector for permission to install the dish. The City of Marion had in recent months amended its codes to allow satellite dishes to be installed as long as they met the prescribed requirements. Building Inspector Melvin Dawsey explained the ordinance by saying, "The dish is treated just like any other outside structure. It must be located in the backyard and no part of the structure can be closer than 10 feet from the property line." Dawsey also explained that the city realized that certain situations may arise where such installations may not be practical, and the ordinance could be appealed to the local Zoning Commission for a waiver. "We like to try as best we can to work with our people," Dawsey said. "But when it involves a residence in the Historic District, my hands are tied." Dawsey continues, "I have no jurisdiction there. Permission to install a satellite dish, or anything else for that matter, must be obtained from the Historic Commission."

One more problem added to the bureaucratic hassle that Cooke was facing. If the trees that needed to be trimmed were on his property, there would be no problem. If trees on the street right-of-way needed to be trimmed for any reason, the town's Tree Committee would have to handle that request. At this point, many people would have become discouraged and dropped the whole idea, but for David Cooke it had now become a challenge.

The next step was to request a hearing before the five member Historic Commission. Four members were present for that Monday night meeting when Cooke presented his case. He told the group of his desire to have a satellite system, and that he was willing to do whatever was necessary to install the dish in such a way as to maintain the integrity of the Historic District. Cooke added, "I'm going to have a dish." He said he would even abide by their wishes that may dictate location, style, and color. When the vote came, the commission was split, two to two. The absent member would break the tie. Another meeting was scheduled for the following Wednesday with the Historic Commission suggesting to Cooke that he canvass his neighborhood to determine the feelings of his neighbors on the issue. He had 40 hours to put his case together. When the meeting adjourned that Monday evening, Cooke went home and hastily drafted a petition, and by 10:00 that same evening he had obtained 30 signatures supporting his desire to have a satellite television in his home. Cooke's campaign was so intense that he told of one case where he called a neighbor that evening and asked him to sign the petition. The neighbor agreed. Cooke said, "Good! I'll be right over." The neighbor replied, "But I'm in bed...ready to go to sleep." Cooke said, "Well you better put on your pants,

See **Cooke Brews A Stew** on page 56



The city of Marion, located in South Carolina, has approximately 100 homes in its Historical District.

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TRACKERFEED I

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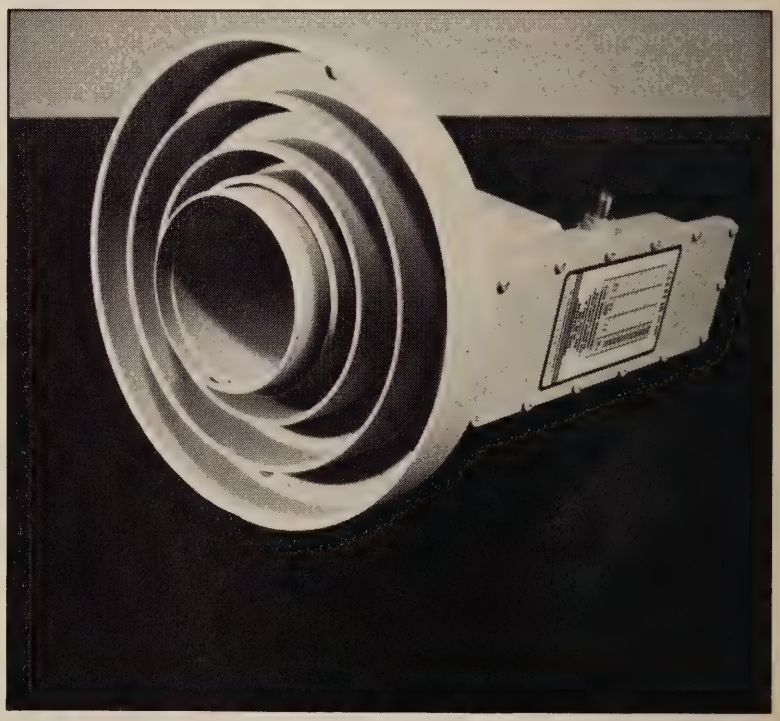

Seavey Engineerings's New Antenna Feed

Seavey Engineering Associates, Inc., announces the ESR-400 circularly Polarized Prime Focus Antenna Feed. This prime focus feed is optimized for use over a broad frequency range (3.4-4.3 gHz). The ESR-40C is able to pick up reception of such satellites as Intelsat, Molniya and Ghorizont.

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This aluminum antenna feed is 15⅛ inches long with an 8¾ inch diameter faceplate. The ESR-40C has an axial ratio of 2 dB maximum and the RF port mates with CPR 229 flange.

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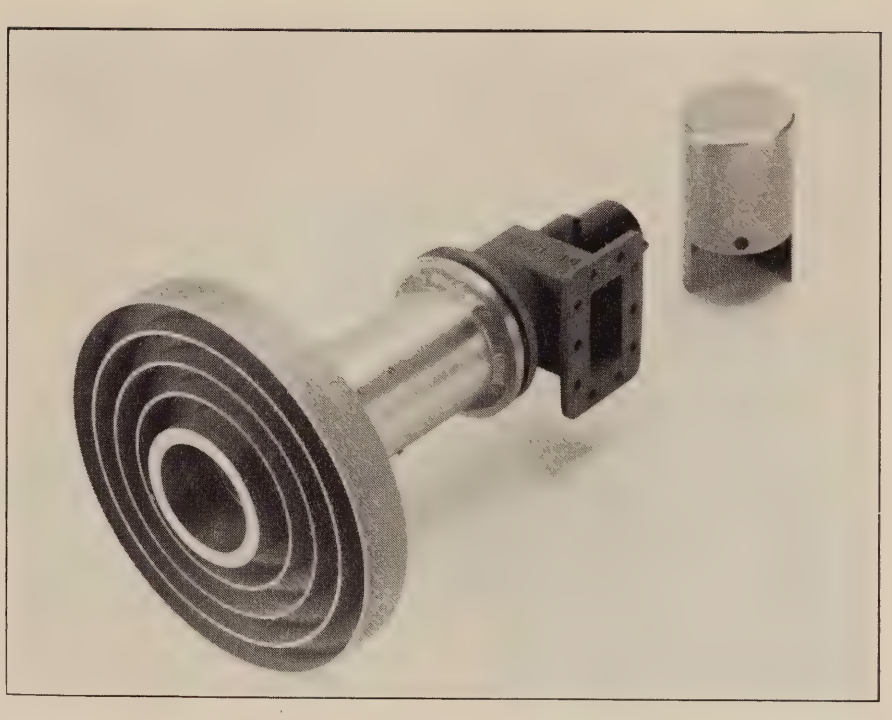

Computer Antenna Design Announces The Hybrid 8

Computer Antenna Design, a California based company, has announced its new antenna, the Hybrid 8. It has been engineered with a solid center for strength and rigidity, surrounded by self-aligned screens for appearance, low wind resistance, and overall weight reduction. It is compression molded in 90 degree segments of sheet molding compound for parabolic accuracy for high gain reception in both C- and Ku-band frequencies.

Ease of installation is another feature of the Hybrid 8. The mount is shipped pre-assembled and there are no ribs or struts to put together. The Hybrid 8 consists of four segments that when bolted together weigh 85 pounds.

For further information contact:

Computer Antenna Design
PO Box 729
Glide, OR 97443
(503) 496-3541

■

Technical Tips

by Bill Barr

Recently, I discovered a neat communications chip that I have had lots of fun with. Perhaps our readers can also devise applications. The MT8870BE chip was designed by Mitel Communications in Kanata, Canada, a major manufacturer of telephone devices. This chip allows you to switch equipment on and off using tones. Satellite broadcasters use these tones to roll VCR's at commercial breaks on their networks. More about this later, first a little background.

Dual-Tone Multiple-Frequency (DTMF) or touch-tone telephone dialing is now common wherever telephones are used. The components associated with decoding the tones are cheap and readily available. As the name implies, if you press a button on your touch-tone telephone, dual tones are sent in harmony. This prevents false triggering down the telephone line by ambient noise coming from the off-hook handset. These tones activate switching systems at the telephone exchange and connect you to the number you dialed.

Tone switching is also used on satellites as a means of inserting network commercials or switching broadcast feeds on a shared transponder. You probably have heard the tones and wondered what they were.

Tone switching is also used on satellites as a means of inserting network commercials or switching broadcast feeds on a shared transponder. You probably have heard the tones and wondered what they were.

Listen carefully to CNN or ESPN at the top or bottom of the hour, or when they go to a commercial. There is a fast burst of tones audible, the closest thing to it in print is, diddle-e-dit. These tones roll tape recorders at affiliate networks inserting a local commercial. Tones are also used to switch off one network, and bring up another. There was a celebrated case where the tone switch plus its backup failed. Subscribers to a Christian channel on F4, transponder 7, were accidentally treated to several minutes of a well-known adult movie service, who at that time shared the transponder after 8:00 pm.

I thought, rather than roll a tape recorder, I could use the tones to switch off the commercials, or switch channels.

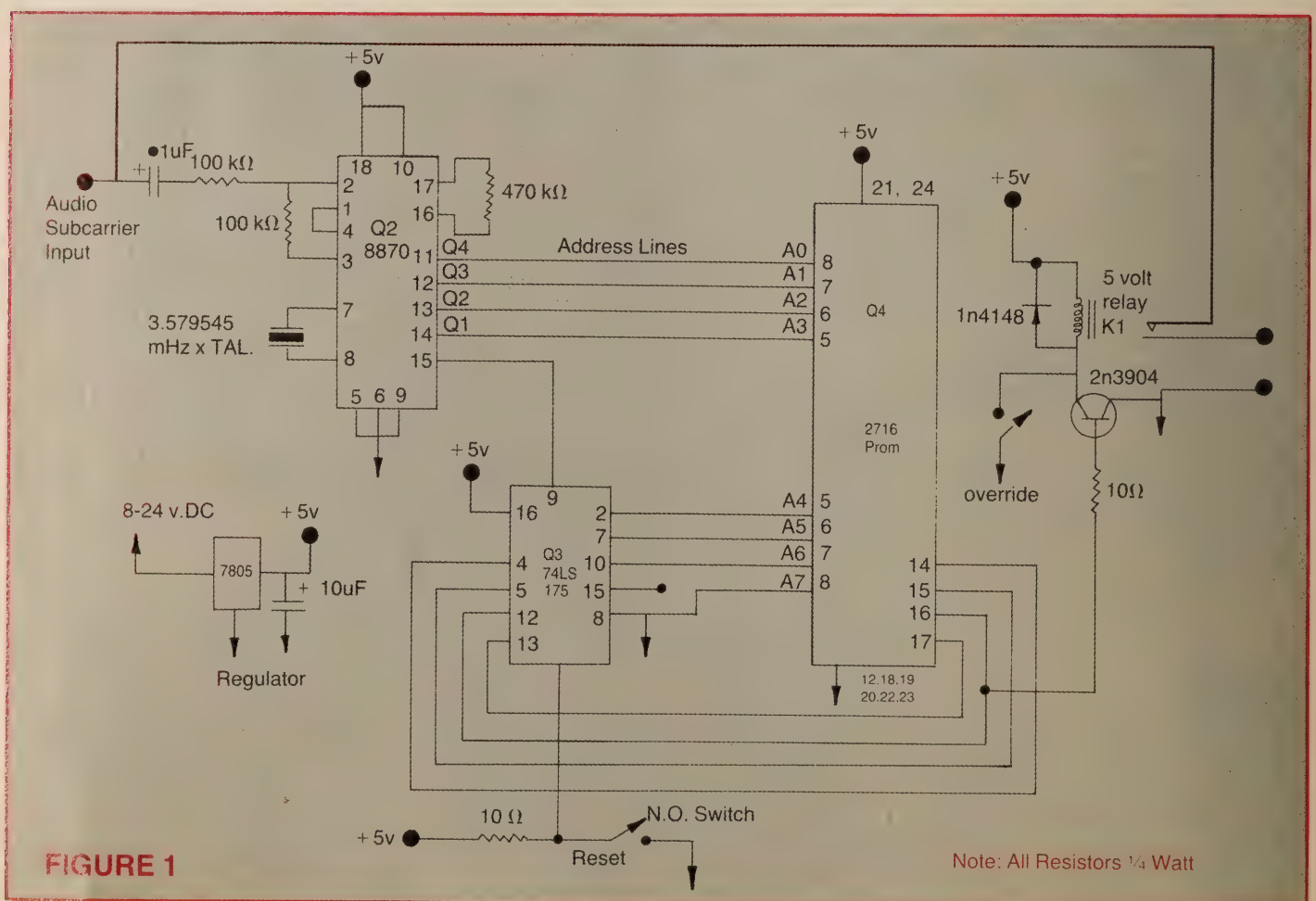

FIGURE 1

Note: All Resistors ¼ Watt

There are a multitude of other applications possible with this device, some are listed below, perhaps you can think up your own.

- *While away from home, phone your answering machine and using a portable auto dialer, such as the Radio Shack model 43-138, send a secret seven digit code to the DTMF receiver, via the answering machine speaker. This pulls a 110 volt relay that switches on the lights or TV set as an anti-burglar device.*
- *Using the same 110 volt switch, remotely start the coffee pot via the telephone and have it ready when you get home.*
- *A friend uses this chip to edit radio traffic on his ham radio. Secret DTMF tones, known only to a few of his friends, are transmitted and this switches on his speaker. When a transmission is heard on the radio speaker, it must be a friend, all other radio traffic is cut from the speaker. This is known in the biz as select calling.*
- *I recently installed a DTMF switching system in the head-end of a Satellite Master Antenna System (SMATV). Using the tone switch, the owner remotely switches channels or satellites from his home 35 miles away.*
- *If you have a remote switching application, tone switching is a good solution.*

Theory of Operation:

The total circuit has only three chips and several peripheral components.

1. Mitel 8870BE Integrated DTMF Receiver.
2. 2716 12 Address x 2 Data Bit Prom
3. 74LS175 Flip Flop

If a composite DTMF signal is applied from the audio output of a satellite receiver to pin 2 of the DTMF decoder chip, the device processes all the 16 possible incoming tones and outputs a four bit binary code (see Figure 1) to be analyzed by the prom. When the binary output matches the program in the prom, an output from pin 16 of Q4 drives the 5 volt slave relay (K1) on. This relay can be used to close the contacts on a larger 110 volt AC relay and supply power to an appliance, or drive other servo-circuits.

Figure 2 shows the 16 DTMF tones presently in use and the binary output produced at the output of pins 11 through 14 on Q2, the Mitel 8870 decoder chip.

The prom is programmed using a prom programmer. If this equipment is not available, do not despair, I will give you a source for preprogrammed proms in the parts list at the end. The example program shown in Figure 3 are the codes for ESPN, 048* = ON and 048# = OFF. The CNN codes are 024* = ON and 017# = OFF. When you identify how the program is compiled for the ESPN codes in the table, you can simply write a program for other codes.

I considered designing a circuit board to simplify the assembly. But I

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found it very simple to assemble all the parts on a proto-board. All the components are off-the-shelf except the Mitel chip. It is available from the following stocking suppliers:

Canada—Mitel (613)592-2122 Ext. 1492, Gale Smith.

West coast—Pacesetter Elect (714) 779-5855, Erroll Bird.

Mid-west—Anthem Elect (303) 790-4500, Steve Weber.

East coast—Mid-Atlantic Elect (609) 931-5305, Herb Thompson.

If you require preprogrammed proms, a circuit board, or the tones for other satellite services write:

J.V. Electronics
RR #1
Colgan, Ontario
Canada, L0G 1G0

■

FIGURE 2

Touch Tone Character	Binary Output Q1, 2, 3&4
D	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
0	1010
*	1011
A	1101
B	1110
C	1111

FIGURE 3

Prom Data For ESPN ON

First Digit = 0

0000	00
0001	00
0002	00
0003	00
0004	00
0005	00
0006	00
0007	00
0008	00
0009	00
000A	10
000B	00
000C	00
000D	00
000E	00
000F	00

Second Digit = 4

0010	00
0011	00
0012	00
0013	00
0014	20
0015	00
0016	00
0017	00
0018	00
0019	00
001A	00
001B	00
001C	00
001D	00
001E	00
001F	00

Third Digit = 8

0020	00
0021	00
0022	00
0023	00
0024	00
0025	00
0026	00
0027	00
0028	30
0029	00
002A	00
002B	00
002C	00
002D	00
002E	00
002F	00

Fourth Digit = *

0030	00
0031	00
0032	00
0033	00
0034	00
0035	00
0036	00
0037	00
0038	00
0039	00
003A	00
003B	40
003C	00
003D	00
003E	00
003F	00

Prom Data For ESPN OFF

Fifth Digit = 0

0040	00
0041	00
0042	00
0043	00
0044	00
0045	00
0046	00
0047	00
0048	00
0049	00
004A	50
004B	00
004C	00
004D	00
004E	00
004F	00

Sixth Digit = 4

0050	00
0051	00
0052	00
0053	00
0054	60
0055	00
0056	00
0057	00
0058	00
0059	00
005A	00
005B	00
005C	00
005D	00
005E	00
005F	00

Seventh Digit = 8

0060	00
0061	00
0062	00
0063	00
0064	00
0065	00
0066	00
0067	00
0068	70
0069	00
006A	00
006B	00
006C	00
006D	00
006E	00
006F	00

Eigth Digit = *

0070	00
0071	00
0072	00
0073	00
0074	00
0075	00
0076	00
0077	00
0078	00
0079	00
007A	00
007B	00
007C	80
007D	00
007E	00
007F	00

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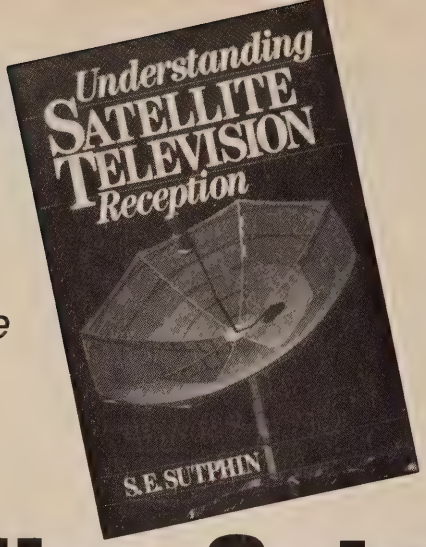

A 'history book' of the satellite industry, this book follows the growth of TVRO from its inception.

Understanding Satellite Television Reception

On September 14, the satellite industry marks its 10th anniversary. It was on that date in 1976 that Taylor Howard installed his own operational home satellite earth station. The events leading to this occasion are covered in the book *Understanding Satellite Television Reception*, written by S. E. Sutphin.

In a somewhat narrative style, the author devotes an entire section of this book to interviews with three key figures of the satellite industry: Taylor Howard, director of research for Chaparral Communications; Chuck Hewitt, executive vice president of SPACE; and Chris Schultheiss, president of SuperGuide and former editor of Triple D Publishing. Through the reflections of this trio, the reader gains an understanding of how the satellite industry evolved from a purely hobbyist pastime to a key player in the home entertainment marketplace. Recounting the struggles, obstacles, and successes involved in this evolution, the reader is left with the feeling that he has witnessed a great discovery, perhaps the way friends and relatives felt when Edison's first light bulb illuminated a darkened room.

In a "fairly nontechnical" manner, the author devotes the first section of his book to an explanation of the technology behind satellite television. Beginning with Isaac Newton's law of gravity, he proceeds to explain how a satellite can be positioned at a certain distance (now referred to as the geostationary orbit) to guarantee that it will rotate at the same speed as the Earth.

The author delves into the principles of communication and applies them to the use of man-made satellites. This section also explains how land-based control centers enable these satellites to maintain their orbit. An explanation of polarity and satellite designations, all presented in an easy-to-understand fashion, completes this section.

From this point, the author examines the antenna (including mounts and drives) and receive portions (the feedhorn, LNA, downconverter, and receiver) of a satellite system. In discussing the antenna, the author covers the various types of antennas, as well as how to understand antenna specifications.

One section of the book is devoted to pictures and specifications on earth station components offered by various manufacturers. To complete his book, the author adds a glossary of satellite terminology and appendices which include: footprint maps, satellite locations, the Cable Communications Policy Act of 1984, the SPACE Model Zoning Ordinance, Senator Barry Goldwater's Statement, and Earth Station Equipment Manufaturers & Suppliers.

In a span of 107 pages, the reader receives a quick overview of the industry's beginnings and its growth, along with a treatment of equipment available on the market today. It's light reading. It makes good reading for old-timers and for new consumers. The price of this book is $27.95 and you can order it by writing to: Prentice-Hall, 200 Tatpan Rd., Old Tatpan, NJ 07675, or by calling (201)767-5049. ■

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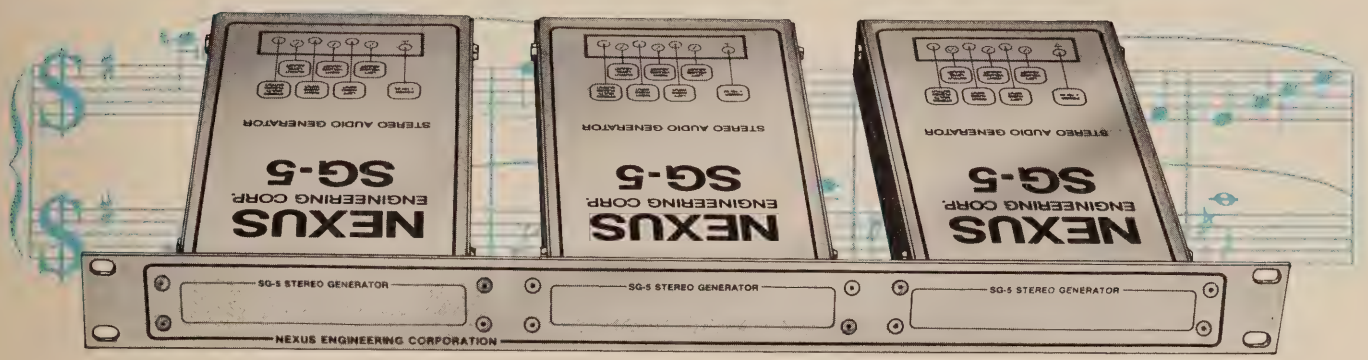

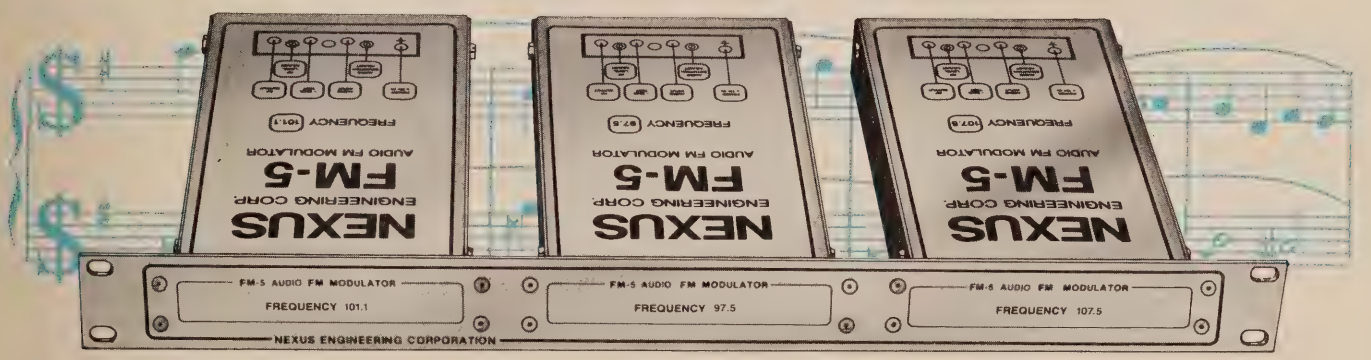

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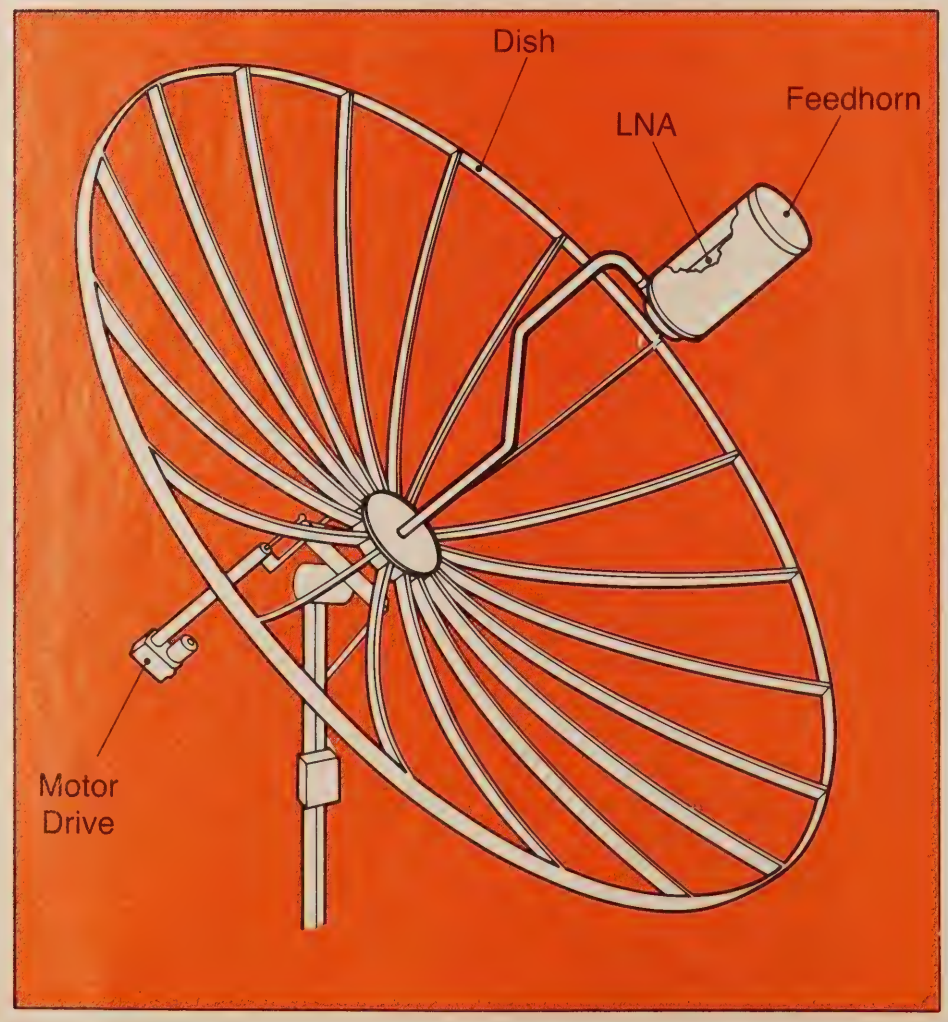
Purchasing A Satellite System

by Sara Fletcher

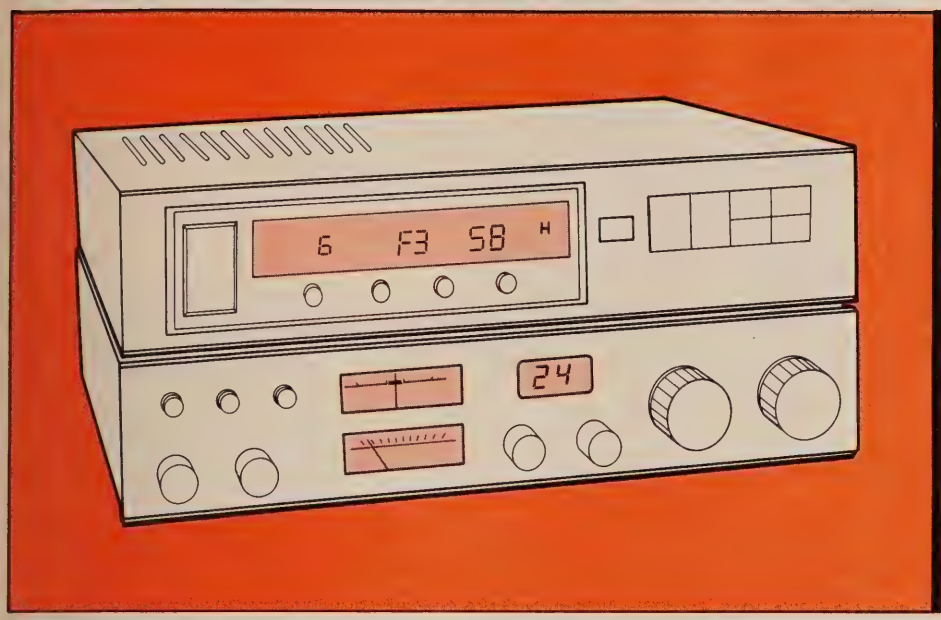
Satellite systems, frequently referred to as dishes, are appearing everywhere. Consumers, both inside and outside of cable franchise areas, are purchasing satellite systems in order to enlarge their television viewing capabilities. Perhaps you are considering the possibility of buying a unit for your own family, but realize that you do not have adequate information to guide you in making a wise purchase. What should you know before you venture through the door of a satellite dealership?



It is necessary for you to understand the basic terminology used in the satellite industry and the equipment included in a system. This will enable you to grasp what the salesman is talking about and will place you in a better position to decide what viewing capabilities you wish to have. It will be beneficial for you to study carefully the drawings of a satellite system, and read through the explanations of the terminology in order to come to a basic understanding. It is not necessary for you to comprehend the technical workings of the system; just be aware of the basic terminology and how to utilize each portion for your own benefit.

Explanation

The dish, or antenna, is able to receive signals from only one satellite at a time. It converts the signals allowing you to receive a TV program. Each satellite will allow you to receive up to 24 different channels (called transponders). The receiver inside your house is what allows you to select the channels. Instructions for programming each satellite and channel are provided with the purchase of the receiver. Many dealers, when installing the system, will program the receiver for the customer. Turning the dish to receive signals from a different satel-



Actuator: The mechanism that drives and controls the dish as it scans the sky for satellites.

Satellite Receiver: A component that is placed inside the house and is user operated to select and tune satellite transponders (channels).

lite is accomplished by using a hand crank or by means of a motor-driven device on the dish assembly, run by the actuator from within the house.

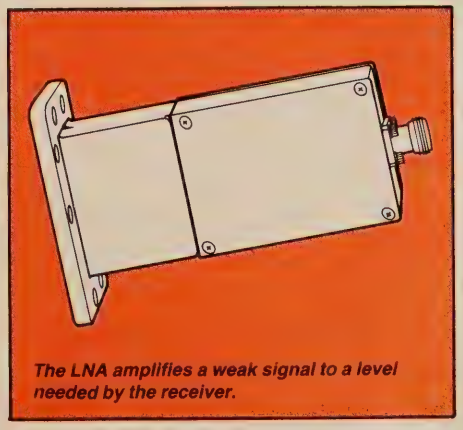
Other Things To Consider

Before making your purchase, you will need to make some other decisions. One of these is whether to buy a solid or mesh dish, and what color. Both kinds of dishes provide the same reception, but mesh dishes (the ones with holes in them) seem to have a more aesthetic appeal; they tend to blend into the surroundings. Various solid colors in dishes are available, as well as some that are painted with designs and scenes, and even some personalized ones.

Another decision you have to make is the size of dish you will purchase. Basic sizes are the 6, 8, 10, and 12 foot dishes. The decision on what size to buy is determined by your location in the country in relation to the satellites, and from how many satellites you want to be able to receive signals. Some of the very small dishes, like the 6 foot, can only receive signals from one of two satellites. Many customers are satisfied with these viewing capabilities. It will be helpful for you to purchase a copy of OnSat magazine which is a viewing guide for consumers. You will be able to see what type of programming is provided on each of the various satellites.

Before you buy an LNA, you will need to determine if you wish to have multiple hookups for different TV sets in your house. If you decide to use the satellite system on only one set in the house, then you will only need a single LNA and one in-house receiver. If you want the capability of watching the same program on two or more sets, you will still need a single LNA and one receiver. The other sets can be wired from the one receiver.

If you want to be able to have more flexibility, there are some additional options. You can purchase an additional receiver for the second TV set, and then different programs (from the same satellite) can be watched at the same time. Unless you have a dual LNA or downconverter, both sets would have to be tuned into even channels (2, 4, 6, etc.) or odd channels (1, 3, 5, etc.). Of course, if you have plenty of room and plenty of money, a separate satellite system can be purchased for each TV set!



The LNA amplifies a weak signal to a level needed by the receiver.

Receivers And Actuators

Many receivers and actuators are now available on the market. In addition to shopping in several stores looking for the best price, be certain to look for ease of utilization, basic capabilities, attractiveness of design, and warranties. And do not forget to consider dealer service and installation.

You will also want to decide between wireless and wired remote options, as well as the receiver's capabilities to fine tune the audio and video signals coming into it. It is helpful to check with the dealer about the hookups available for your VCR and stereo. You may wish to purchase a video control center that expands your equipment capabilities. You also need to consider the addition of separate electrical wiring for your whole entertainment center, which should be separate from the rest of the wiring in the house. Another helpful feature is the purchase of an inexpensive voltage surge protector which protects your equipment against strong electrical power surges or lightning.

Other Considerations

The location of the dish itself is another decision that has to be made. You can select a site yourself, but it is necessary for you to get a dealer to come onto your property to do a site survey. This will determine whether the site you have selected is free of terrestrial

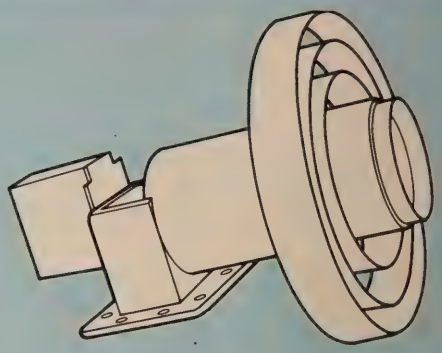
interference. In other words, there must be no obstructions between the dish and the satellites in the sky. Trees, telephone lines, clotheslines, electrical wires, radio and television towers, etc. are all possible sources of interference.

Once the dealer determines that the location is suitable, you will have to decide on a permanent or portable installation. Unless you feel you will be relocating in the near future or you are living on rental property, a permanent installation in concrete is the better way to go. Be certain to check with your dealer and county or city officials as to any zoning laws or licensing fees that must be paid.

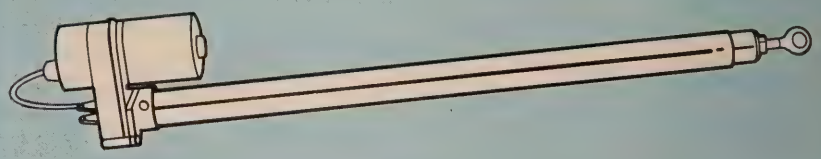
You are now a well-informed buyer. Good luck as you embark on the exciting adventure of purchasing a satellite system and joining the millions of happy customers who are enjoying daily what the 'friendly sky' has to offer. ■

Illustrations by Douglas L. Stoll

The feedhorn is a device which focuses the signal reflected from the antenna surface into the waveguide part of the LNA. The motor drive helps turn the dish so that you are able to receive signals from a different satellite.



Feedhorn



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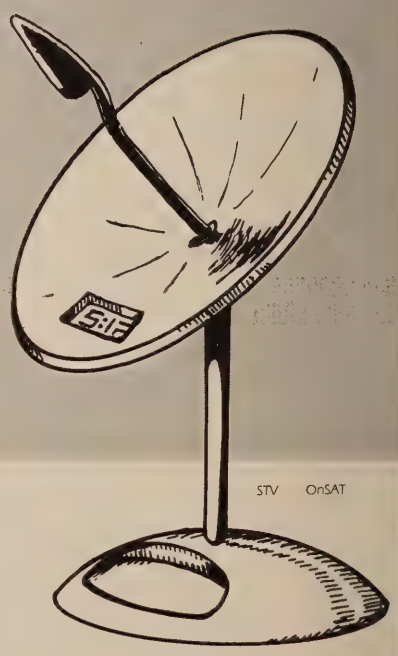

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OWNER PROFILE

Chip Ganassi:

An Indy Car Driver

by Terrie Cobb Payne

Chip Ganassi is one of the youngest Indy car drivers on the circuit. A man who likes life in the fast lane, and one who appreciates the finer things in life, he purchased his home satellite system to complete his new home in April of 1985. Chip bought a beautiful brick condo in an upper-scale suburb of Pittsburgh, had it stylishly decorated and finished his dream-come-true with a top-shelf earth station. However, the joy of ownership was soon shadowed by complaints from neighbors. Chip admits the 10 foot fiberglass reflector looked stark, planted on an empty hill barren of grass or trees with not even a driveway to soften its silhouette against the greening spring woods behind his home.

Ganassi had checked in advance with the builders and his nearest neighbor to see if there were any objections to the placement of a dish and was assured there would be no problems. Zoning was not in question, so he was quite shocked when he finally received notice that he had been the focus of controversy, petitions, and meetings for several weeks. Chip offered to replace the fiberglass parabola with a less obtrusive mesh reflector. A grey perforated aluminum antenna now stands on the spot, which has been landscaped, and everything blends together gracefully. There have been no further complaints so perhaps a compromise was achieved.

Chip is enthusiastic about having an earth station in his home. "I love it! I never had one before I lived here. If I'd never had a dish and only had cable, I probably would have been able to live with that. But, I'll tell you what, once you've had one, you can't live without it. I can see how people go without them because they don't know what they are missing. They don't know what is available or anything about them. Once you've had one...I mean, I go to my parents house now, they have cable with 25 channels, and I say, 'Isn't there anything else on?'

"Just because you've got a dish doesn't mean you're necessarily a big television watcher. I'm not one of those people that watch it all the time. The thing is—when I watch television, I like to watch it all the time. The thing is—whether it be sports on the weekend, CNN, you know, or races.

"If I'd never had a dish and only had cable, I probably would have been able to live with that. But, I'll tell you what, once you've had one, you can't live without it."

"Every race in the country that's televised, I can watch now. During the day, the only thing I watch is Headline News. In the evening, I watch movies, ESPN, or whatever appeals to me. And in the past couple of months, I have been finding other channels that I like. There's a lot of good programming on Galaxy 1, transponder 22; it's kinda' like a public station, the Discovery Network. There is a lot of variety up there, like that, and the Disney Channel. I mean, I never thought I would be watching Disney, but it is really good!"

Chip Ganassi started his racing career in high school, racing motorcycles in Motorcross races. He switched to cars while in college. The weekend following graduation from Duquesne University he drove at the Indianapolis 500 and was the fastest rookie qualifier. In 1983, he was CART's most improved driver, and of the last 25 races, he has finished in the top 10 over 12 times.

In 1983, Chip finished ninth in the PPG/CART INDY WORLD SERIES, and seventh in the Indianapolis 500.

Each year he is sponsored by a different major corporation. These have included 1st Commercial Corporation, Servistar Hardware, Old Milwaukee Beer, and Calumet Farms of Lexington, Kentucky.

The handsome athlete had successfully completed half of the 1984 series when he crashed in turn two at the Michigan International Speedway. After six months of recovery, his injuries healed and he has returned to the track.

When asked if he knew of other sports personalities who had home satellite systems, he said, "Almost all of the other racers have them. I know Bobby Unser has one. In fact, he has a few; one at his house in Albuquerque, one at his ranch, and one on his Newall motor home. It's surprising, when you talk to someone who has one, and

See **Chip Ganassi** on page 70

"Just because you've got a dish doesn't mean you're necessarily a big television watcher. I'm not one of those people that watch all the time. The thing is—when I watch television, I like to watch what I want to watch—whether it be sports on the weekend, CNN, you know or races."

It's About Time Someone Cle

As this actual screen to screen comparison shows, Starcast's™ exclusive Pic

There are some things that just don't belong on television today.

"Sparklies," for example.

You know, those disgusting little electronic glitches that are forever turning otherwise decent television programs into something unwatchable.

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Just push the PicturePlus button and "sparklies" virtually disappear.

Giving you the clearest picture in satellite television.

The Starcast receiver also comes with a built in antenna positioner, full-function remote control, parental lock, digitally synthesized audio, and more.

The Starcast receiver has it all, including built in antenna positioner, "Snapshot Memory," remote control, stereo, true C/K Band compatibility and more. And it's ready to accept any of the major descrambling units now available.

And there's even a feature called "Snapshot Memory" that remembers satellite location, video fine tuning and audio mode.

As you'd expect, the Starcast receiver is truly C/K band compatible and ready to accept any descrambler on the market.

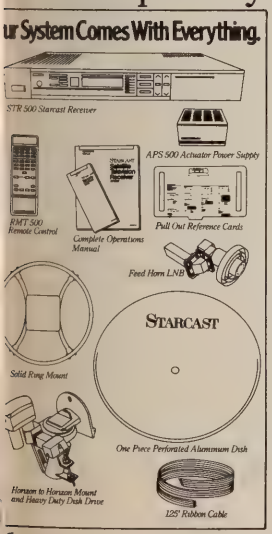
Of course, there's no way we'd let

ıed Up The Filth On Television.

ius™ circuitry can turn a dirty picture into one the whole family can watch.

a receiver this good be matched with anything less than a perfectly matched system. So to make sure you get perfect pictures all the time, Starcast is sold as a complete system. With everything from our one-piece 8-foot perforated aluminum dish right down to the 125 feet of UL-approved ribbon cable designed to improve your picture.

And it all comes from the same place. So, in the unlikely event something goes wrong, there's just one place to call.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CINCINNATI MICROWAVE COMMUNICATIONS

The Clear Choice In Satellite Television.

Hanging By A Thread: The Tethered Satellite Program

by Robert G. Nichols

A space shuttle orbits silently above the blue and white planet Earth. From inside its payload bay, a long boom extends straight up and releases a small spherical satellite which moves slowly up and away from the spacecraft. But wait...the shuttle didn't fully surrender its payload to outer space. Look closely and you'll see a thin, almost invisible thread running from the end of the boom to the satellite. As it moves further and further away, the satellite disappears until all you can see is the gossamer filament stretching upward from the shuttle towards deep space.

In about an hour, the small satellite is reeled out a distance of 12 miles. After remaining at this distance for several orbits, the satellite is carefully reeled back to the shuttle and placed in its berth in the payload bay.

It's called the Tethered Satellite System (TSS), a project that uses a wire or tether to 'troll' a scientific satellite 12 to 62 miles above or below the orbiting space shuttle. This experimental research project will help scientists understand the orbital dynamics of tethered spacecrafts and explore their practical and scientific capabilities.

The potential uses for tethered spacecraft technology are enormous. As scientific research tools, tethered systems will allow astrophysicists to observe the ways large electromagnetic bodies interact with the ionosphere, that layer of charged particles or plasma that surrounds a planet. Satellites lowered downward on a tether can collect data about the atmosphere at altitudes too low for conventional satellites and too high for research balloons.

Beyond scientific applications, orbital tethers can help solve a number of everyday spaceflight problems. For example, long, electrically conductive tethers can supply power to low-Earth orbiting

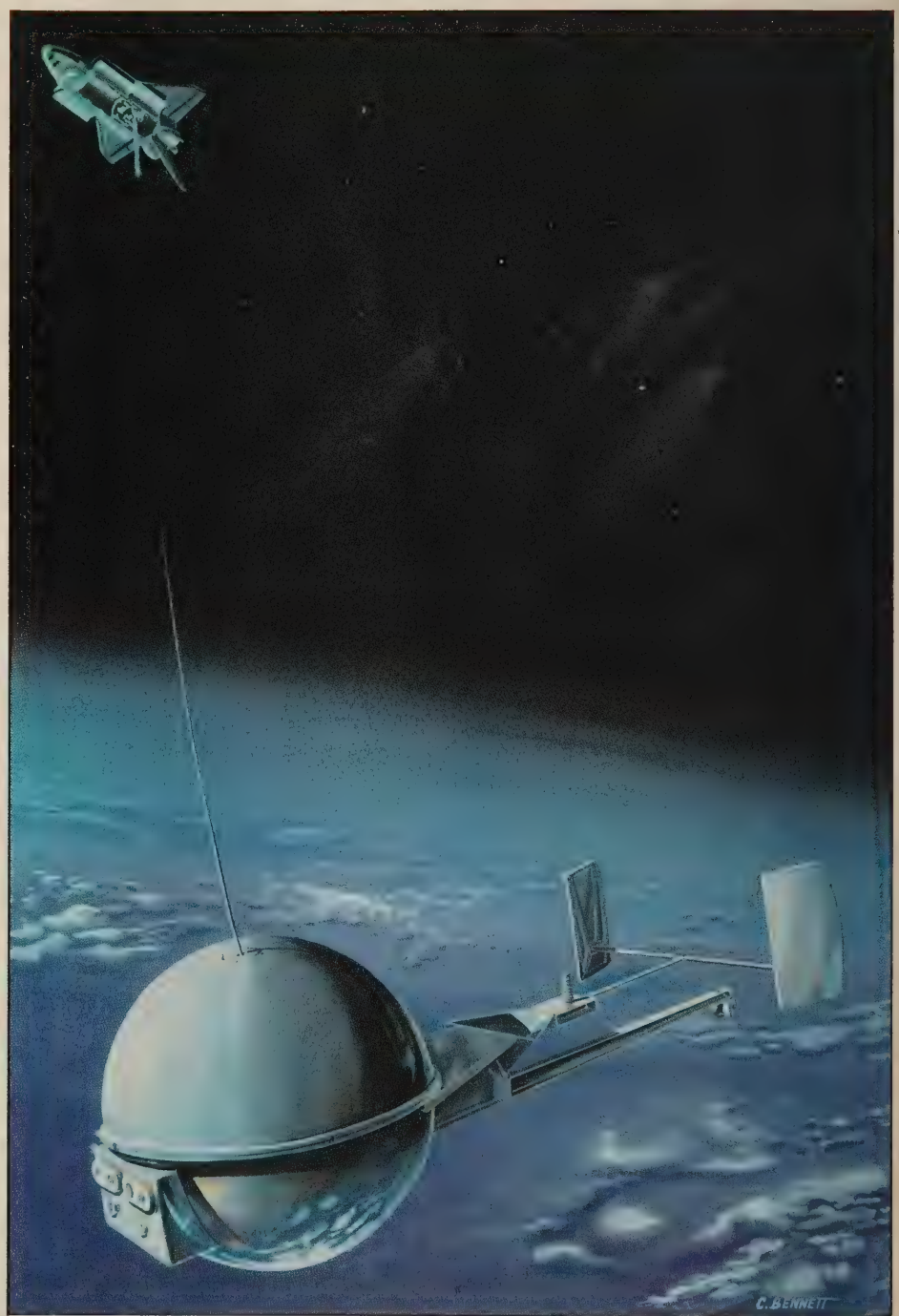


PHOTO COURTESY MARTIN MARIETTA

During the second mission, TSS-2, the satellite will be lowered downward 62 miles into the upper atmosphere. The vertical stabilizers in the rear keep the sensors in the nose of the satellite facing the direction of travel.

spacecrafts. As the tether cuts through the Earth's magnetic field, an electrical current is induced: the longer the tether the greater the current. Equipped with a sufficiently long tether, a space station wouldn't need expensive solar panels or batteries.

A tether several miles long also makes an impressive antenna for low frequency radio transmissions. This is of particular interest to the US Navy which needs extremely low frequency transmissions to send messages to its fleet of submerged submarines.

Tethers can also help boost satellites into higher orbits by taking advantage of the gravity gradient that exists between the higher satellite and the lower space shuttle. When a higher tethered satellite is released from its tether it tends to move upward into an even higher orbit. To understand how this works, read the boxed section titled, "Tethered Orbital Mechanics."

The Tethered Satellite System project dates back to 1972 when Dr. Mario Grossi, staff scientist at the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, suggested that a very long wire be deployed from the space shuttle. As initially proposed, the tether would act as a very long antenna and transmit electromagnetic micropulses that would be received on Earth and analyzed. This information would give scientists a better understanding of how large bodies interact with a planet's ionosphere.

But was the whole idea feasible? Could a space shuttle safely deploy miles and miles of wire, keep the entire structure under control for several hours, and then reel the whole mess back in? Or would the tether oscillate wildly until the structure endangered the space shuttle and crew?

Studies conducted at the Smithsonian Observatory showed that the project was possible, that a huge orbiting structure could be controlled with little or no danger to the shuttle and crew. Computer models predict that the tether will act just like a long pendulum, swinging back and forth as it orbits the Earth. "So far our studies indicate that these oscillations are rather modest in amplitude," Grossi said. "It might move 10 degrees but no more, so there is no danger that the tether will get wrapped around the shuttle, for instance."

Officially okayed in the fall of 1974, the $100 million project would be equally funded by NASA and the Italian National Research Council's Piano Spaziale Nationale (CNR/PSN), according to Grossi. (By sharing costs with the Italian Space Agency, NASA is establishing closer ties with the European space community as well as stretching its continually limited budget.) However, the project would be a lot more ambitious than the one Grossi first proposed. An instrument-carrying satellite would now be attached to the free end of the tether. During the course of three missions, the satellite will collect data about the upper reaches of the Earth's atmosphere and the lower reaches of the Earth's ionosphere. NASA's part of the project is to provide the shuttle launches, the mechanism for deploying and retrieving the tether and satellite, and 62 miles of tether. CNR/PSN is responsible for building the satellite.

PHOTO COURTESY MARTIN MARIETTA

Tethered Satellite System program emblem.

Grossi said that a single satellite will be used for the Tethered Satellite project but that modular sensors and instrument packages will be swapped out for each mission. Built for CNR/PSN by the aerospace firm Aeritalia, of Turin, Italy, for CNR/PSN, the spherical aluminum satellite measures 5.3 feet in diameter and weighs some 1,100 pounds.

The key to the project is, of course, the tether. A braided kevlar cable with a copper core, the tether is only 1/16 inch thick and weighs less than 4 pounds per mile. Despite its light weight, the kevlar tether is very strong with a breaking point of over 650 pounds and is designed to be used on a minimum of 10 missions. The tension on the tether will be no more than 9 pounds during the 12 mile deployment and 45 pounds for the 62 mile deployment. (Though the satellite has a mass of over half a ton, it has no weight in space. The tension on the tether comes from the centrifugal force and oscillation.)

The first and third missions will focus on electrodynamic research. Here the tethers will be deployed 'upward' away from the planet; for TSS-1, 12 miles; and for TSS-3, between 12 and 62 miles. Electromagnetic and plasma sensors for measuring the density and composition of the charged particles that make up the ionosphere will be mounted on two booms that can be extended up to 16 feet out from the satellite. As the satellite passes through the ionosphere, it will create a bow wave and a trailing wake of charged particles. The satellite will rotate about 1 rpm so the sensors can measure the difference in the densities between the bow wave and the wake. During these two missions, micropulses will be transmitted through the tether which scientists back on Earth will analyze. This experiment will be especially useful to scientists who study Jupiter which has several moons orbiting within its ionosphere.

For the second mission, the satellite will be deployed 'downward' toward the Earth for atmospheric observations. This time the tether will be deployed a full 62 miles. If the shuttle is in orbit 150 miles up, the satellite will be less than 90 miles above the Earth's surface. This is an area that can only be explored a few moments at a time by sounding rockets. During TSS-2, the satellite will remain in this part of the atmosphere for as long as 20 hours.

For this mission, the extendable booms will be replaced by aerodynamic control surfaces. Though space technically starts at about 75 miles up (400,000 feet, the limits of what NASA defines as the "sensible" atmosphere), there are enough air molecules at 90 miles to have appreciable effect on the satellite. The stabilizers trailing the satellite will keep the satellite's sensors facing forward.

In addition to studies of the ionosphere and atmosphere, scientists and engineers will be paying close attention to the orbital dynamics of the tether system. Their experience with the TSS project will help them plan future space projects using orbital tethers.

The tethered satellite will be deployed by a winch and a collapsible boom, built by Martin Marietta of Denver, Colorado. The boom has a round cup-like structure on the end that holds the satellite. For deployment, the boom extends straight up in the payload bay and a spring mechanism in the cup pushes the satellite away. As the satellite floats away, a reel in the bay unwinds the tether which runs up through the hollow boom to the satellite.

Small thrusters in the satellite are fired to keep the satellite moving away from the spaceship. When the satellite is about a half a mile from the shuttle, the orbital torque will be strong enough to keep the satellite moving away at a rate of about 10 miles an hour.

Once it is fully deployed, the satellite's thrusters will be used to dampen oscillations. To further reduce oscillations, computers will automatically reel the tether in and out several hundred feet.

NASA had planned to launch TSS-1 in 1988. However, the Challenger accident put the project on hold. "It's possible," Grossi predicted, "that the first mission might be moved to 1990...maybe. That wouldn't be too bad." No matter when NASA reschedules the missions, Grossi is sure that the Tethered Satellite program will open new areas of scientific research and spaceflight technology. ■

Gemini Tether

Space tethers were used as far back as NASA's Gemini program in the early 1960's. To see if tethers could be used for spacecraft station keeping, the two-man Gemini XI space capsule was tethered to an unmanned Agena rocket booster while in orbit. When the 100 foot tether was fully played out, the capsule thrusters fired and the two spacecrafts spun around a common center of gravity at about 0.1 feet per second. The resulting centrifugal force kept the tether taut and both vehicles maintained their relative positions.

While the tether experiment was successful, there were some problems. For example, at one point a Gemini XI astronaut radioed to mission control, "This tether's doing something I never thought it would do. It's like the Agena and I (the Gemini XI space capsule) are having a skip rope between us and it's rotating and making a big loop." The astronauts straightened out the tether only after much maneuvering.

After the Gemini tether experiments, NASA concluded that there were easier and safer ways to perform orbital station keeping than by using tethers. ■

NASA PHOTO

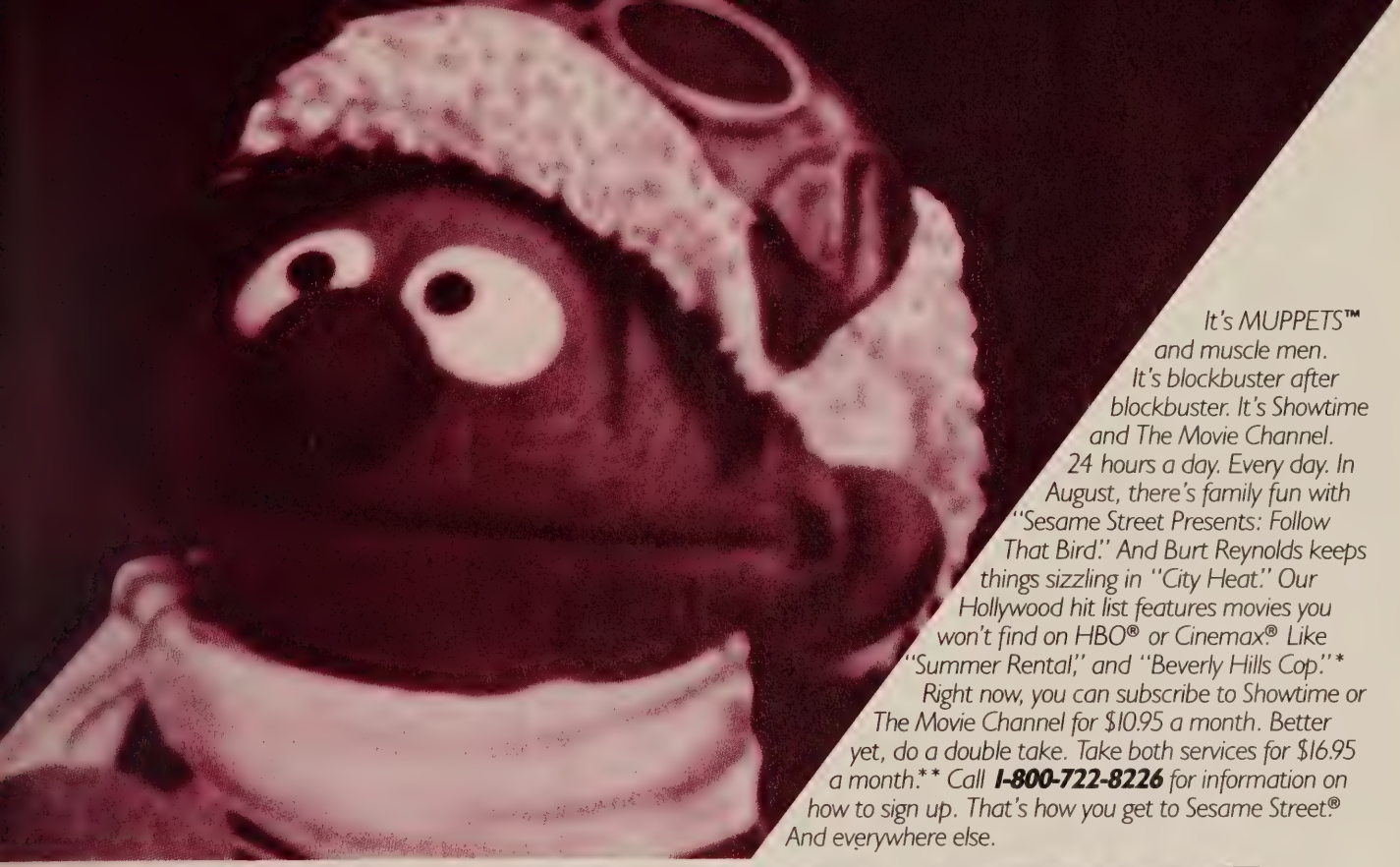
The Agena booster tethered to the Gemini XI space capsule in November 1966. There is no tension on the tether so the tether is slack. The Gemini XI is out of view because this photograph was taken by one of the astronauts inside the space capsule.

Tether Orbital Mechanics

Tethered satellites take advantage of the fact that objects at different orbital altitudes travel at different speeds. For example, a satellite orbiting at an altitude of 160 miles up, travels slower than a satellite orbiting at 150 miles.

If those two satellites are connected by a tether they will travel at the speed equal to the location of their center of mass, somewhere along the tether. The higher satellite is traveling faster than necessary for its orbital altitude, resulting in a net centrifugal force pulling it outward. On the other end of the tether, the lower satellite experiences a downward pull because it is travelling too slow to maintain its orbit and it is literally trying to fall back to Earth.

The orbital dynamics of a tethered system can be used to boost a satellite to a higher orbit. As the tethered satellite moves higher above the shuttle, the centrifugal force becomes greater and greater. If the satellite releases the tether, it accelerates upward as if shot out from a slingshot. This satellite deployment method would mean that a satellite would need less fuel to achieve higher orbits. ■



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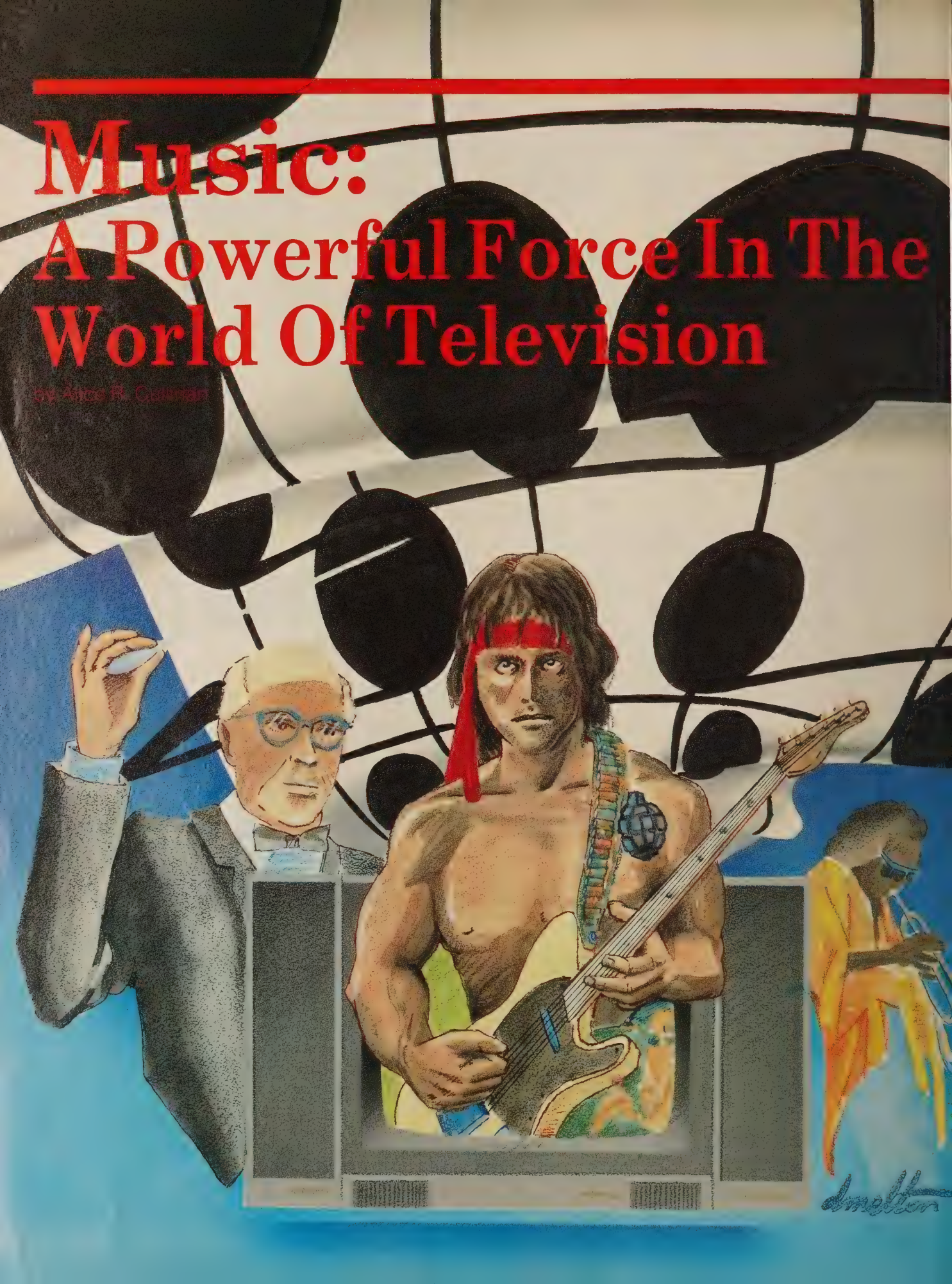
Music: A Powerful Force In The World Of Television

by Alice R. Gutman



MUSIC: A POWERFUL FORCE IN THE WORLD OF TELEVISION

Music is used by TV producers and advertisers to lull us into identifying with whatever is going on at the time. We should be aware of what is happening so we can control this form of brainwashing when we need to.

The melodic theme of your favorite soap opera sounds through the house and draws you, with a subtle magnetism, away from whatever you are doing and entices you to spend 30 minutes or an hour glued to the TV set. The peppy beat of the hamburger commercials or the rhythmic sounds of the soft drink ads work on your mind as you walk to the refrigerator to get a drink, or drive to the fast food restaurant the next day at lunchtime. The feeling of suspense or impending disaster in a scene from a detective story causes your heart to beat faster, even though nothing visual has occurred on the TV screen to cause this feeling.

What has caused these reactions? What is the powerful force that both advertisers and writers have discovered can strongly affect the emotions and actions of their constituents? The answer, of course, is music. It is defined in Funk and Wagnall's New Standard Dictionary as "the science and art of rhythmic combination of tones, vocal or instrumental, embracing melody and harmony, for the expression of anything possible by this means, but chiefly anything emotional." Even the definition reminds us of a fact we have either not realized or have forgotten—the main purpose of music is to affect people emotionally, to get them to feel a certain way.

It will be helpful for us to take a look at how the various aspects of music affect us, and then see how these applications are used by the television industry specifically.

In the field of psychology of music and music therapy, facts have been revealed as a result of various research projects. Music can alter blood pressure rates and cause changes in respiration.

How Music Affects Us

In the field of psychology of music and music therapy, facts have been revealed as a result of various research projects. Music can alter blood pressure rates and cause changes in respiration. A constant exposure to certain types of music can increase one's basic metabolism rate. Music can delay muscular fatigue and under certain conditions can increase the efficiency of mental work. While vocal music is a distracting factor, instrumental music aids in concentration and output. Many offices have music played over the intercom system, but some do not realize that the effects can be counterproductive depending on the particular music being played. I visited the office of an orthodontist recently, considering the possibility of getting braces. I am certain that the doctor had agreed to the installation of a sound system in the waiting room, but he is not carefully monitoring the selection of music his assistants are playing. After about two minutes of nerve-wracking sound (I will not dignify it by calling it music), I decided to wait outside in the fresh air until time for my conference. I had studied the effects of music on one's mood, and knew how this was affecting me. I couldn't help wondering, however, if there would be a lot of prospective brace-wearers of the adult variety who would decide against such treatment after being exposed to that particular type of "music."

Other research has shown that music

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Spaceage technology brings you the first functional on-screen programming guide for the home satellite television industry.

SuperGuide uses your television set to display the scheduled program listings. One push of the button on the remote control switches your SuperGuide to the current time period. SuperGuide recalls the program information for the current time period from its memory bank and displays it one page at a time on your TV screen. Two buttons on the remote control allow you to flip the pages forward or backward allowing the viewer to look at program descriptions for the upcoming week.

Using the cursor control, the viewer can choose a program by simply pressing the "select" button to display the full description of the desired show.

Among the many features included are sports listings by category, alphabetical movie listings, specials, financial regions and much, much, more— All available at the touch of a button.

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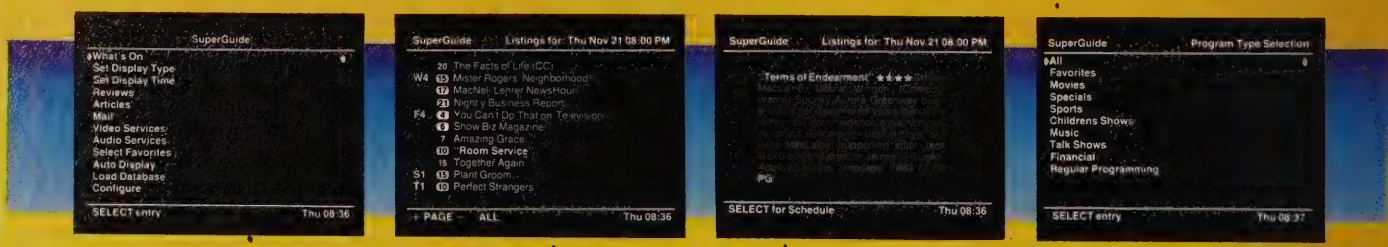

SUPERGUIDE

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lowers the thresholds of sensitivity to other forms of stimulation. Odors, colors, and tastes too faint to be perceived are noticed or identified when music is played. Print too small to be read under ordinary conditions can be read when music is performed. Some pain that hasn't been noticed often comes into the threshold of consciousness when music is heard.

The various elements of music itself result in emotional effects in the listener. Each of these elements: pitch, volume, tonality, melody, harmony, and rhythm have the power to affect one emotionally, mentally, and physically. Is there any wonder that the television industry is capitalizing on this influential medium?

Whether music is high or low (pitch: the number of vibrations of sound) affects us. High pitches, with rapid vibrations, cause nervousness. Low pitches, with slower vibrations, have a relaxing effect. The volume of music is another factor to be considered. Loud music makes some listeners feel "complete," giving them a feeling of protection against physical or psychological intrusion. Perhaps that is one of the reasons teenagers like to wear their headsets and play brain-shattering loud music. A soft volume, on the other hand, often produces a feeling of intimacy, speaking to the timid or withdrawn. It has a tendency to give the impression that one is gently persuading, not coercing the listener.

The actual tone or sound of an instrument also results in varying effects on the listener. A trumpet may cause excitement, while a violin playing the same song may have a relaxing or depressing effect. The actual melody (what we would call the tune) of a song or commercial can lodge in our minds and affect our actions as well as our feelings. The musical theme from "Rocky" and "Chariots of Fire" are good examples of the stirring effects of a strong melody.

How notes are put together in chords which result in a pleasant harmony or a sometimes unpleasant sounding dissonance also affect the listener. Of particular interest is the fact that music may have dissonances which can be either stimulating or irritating. But if the music ends up in a harmonious and orderly fashion, it can result in a sense of emotional satisfaction to the listener. The scene on a soap opera may have dissonant sounding music while the characters are fighting, but when they kiss and make up, the music changes to a more harmonious sound which helps us feel an even greater sense of relief and satisfaction that the conflict has ended.

Rhythm, or beat, is by far the most dynamic and most obvious element in music. It is a powerful force in affecting both the emotional and physical states of listeners and can be utilized alone or in conjunction with the above listed elements of music. It can provoke hysteria or induce sleep. It can excite or depress, cause anxiety, or lull us into a hypnotic state. The tempo of music can affect the beating of the heart and respiration, and incite us to action. A few months ago I watched the week long series of the second episode of "North and South" and noticed the effective use of the rhythm and tone of the drums that instructed the armies to march and fight.

Advertisers have certainly learned the powerful effect of music and thereby utilize it as often as possible. But of equal interest and fascination to me is the use of music by scriptwriters as they attempt to captivate the viewing audience.

Music In Television

As you may have guessed, most music used by advertisers and writers is intended to create a mood. Of course, advertisers want your mood to be a positive one so you will buy their products. Through the use of a catchy melody or striking rhythm, the name of a certain product can be indelibly etched on your mind. The rhythm in the McDonalds™ commercial and the melody/rhythm combination of the Pepsi™ commercials are good examples. One commercial for a wine product has a musical theme that is a cross between a religious and patriotic melody, causing a stirring of one's emotions in a positive manner long before the product itself is even mentioned.

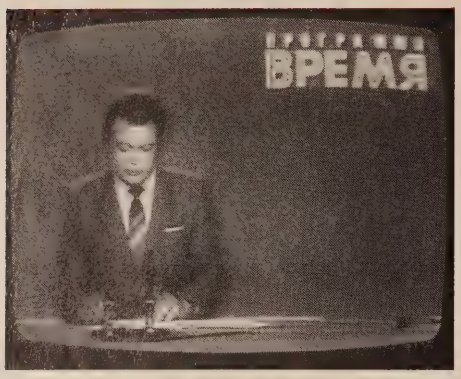
Some of the perfume and hair product commercials use a form of subdued music and speaking to create the effect of gentle persuasion along with the visual stimuli of beauty and seduction, hoping to entice you to buy their products.

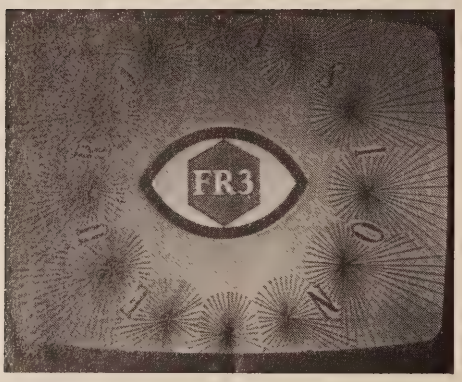
Advertisers have certainly learned the powerful effect of music and thereby utilize it as often as possible. But of equal interest and fascination to me is the use of music by scriptwriters as they attempt to captivate the viewing audience. Most of us are completely oblivious of the role that music is playing in affecting our moods while watching a program. Try the following experiment to get a better idea of the impact of music on your own moods. The next time you are watching a TV program that has a car-chase scene or a segment that involves suspense or drama, watch a portion of the scene until you begin to feel the emotion. Before the scene ends, however, turn off the volume and merely watch the remaining portion of that scene without any audio, and take note of any change in your feelings. This and other experimentation will readily show you the tremendous impact music has on us. Couple this with some suspenseful sound effects, and we are powerfully drawn into the mood the program writer desires us to feel. The effects may be so successful that we get up out of our recliners during the next commercial break and make certain all of the doors and windows are locked!

It is both fun and fascinating to evaluate the music that is so vitally woven into the whole fabric of television and movies. Go back over the various elements of music mentioned in this article and begin your own evaluation. Notice how high pitches and strong rhythms are used in chase scenes. Notice the changes in pitch and the use of other sounds in suspenseful scenes. Watch for flowing melodies in love scenes and soap operas. One word of caution: family members will not always be as excited as you are when you interrupt a dramatic scene to point out how the music is causing the effects they are feeling! Just lean back in your chair, smile quietly and watch what is happening to your family...and to you, if you're not careful! ■

The Feed Finders

by Bill Britton





Think you can't get overseas reception? These were photographed from a TV screen in Colorado! See text for details.

The middle of summer brings about a bad case of the lazies. The days are hot, the satellite programming is not, and everything seems to be holding its breath waiting for the fall season to arrive. A glance at the Special Feeds List this month shows a great slowdown of activity, with a lot of programmers off at the beach dreaming of new ways to startle the world in September.

But, we still have a lot to look at and talk about. So, pour yourself a cool one and let's get down to business.

First things first. You've probably already eyeballed the great pictures of overseas news logos on these pages. These were all photographed by Frank Luman from his TV screen at his home in Colorado. As mentioned last month, Frank uses a multistandard Luxor set he imported from England. If you're interested in this exotic form of news feed finding, Frank is anxious to hear from you. Contact him at 6627 South Cherry Way, Littleton, CO 80121. Please enclose a stamped self-addressed envelope.

Had an interesting note from a reader in Tennessee with a small tale of woe. Seems he went looking for a couple of the feeds on our list for Telstar 1, transponders 9 and 23, and all he found were scrambled pictures. So the list and yours truly are full of beans, etc. Okay, let's take a look at the situation.

First of all, remember that the column is written six weeks before you see it on the newsstand and schedules can and do change. Not too much we can do about that, but it's the main reason we depend on our readers so much to send in corrections or additions to the list.

Now to the nitty-gritty. Transponders 9 and 23 on Telstar 1 are used by the Wold Satellite Network to feed a multitude of programs every day. To the best of my knowledge, they have never been scrambled. (If anyone knows differently, let us know.) So, it sounds like our friend in Tennessee might have a small receiver problem and might want to check it out. Please write again, and let me know how you do.

Also received a large computer printout of feeds noted by Bill Thompson in Virginia. These are very helpful Bill, and I look forward to hearing from you again. It's input from all of you that keeps us going!

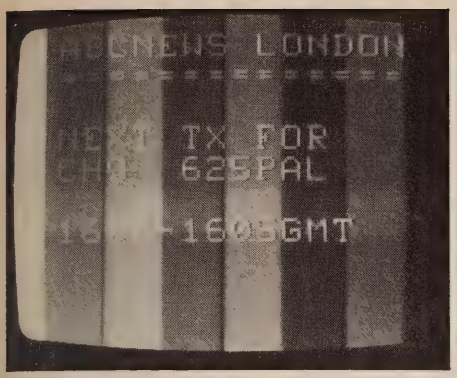
Several readers wonder about transponders used for feeds by some religious groups and why they're scrambled. Cited as examples are the Catholic CTNA on Westar 4, transponder 9, and the Baptist BTN on Spacenet 1, transponder 21. Well, I really don't have the answer as to why these groups should choose to scramble their signals. Perhaps someone from either organization can enlighten us.

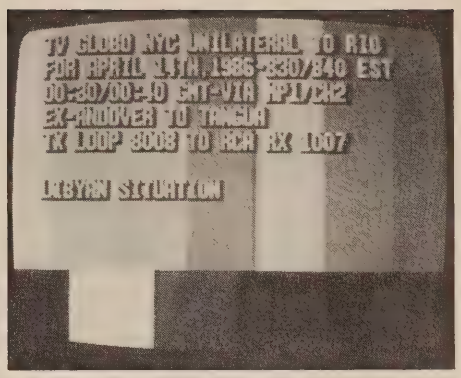
What's NU? Well, Nustar has begun a 24 hour-a-day operation on ASC-1, transponder 11. As reported here earlier, they did some testing a few months ago, but apparently had some uplink problems which made them go dark for a while. Now all seems well, and they have an excellent picture. By the time you read this, their program schedule should be available in your favorite programming guide. As an interesting aside, their station break logo flashes the words, "Scramble Busters." Ah, so.

Also well under way is the Caribbean Super Station on Westar 5, transponder 16. This is another 24 hour-a-day operation with a well-rounded schedule of movies and vintage TV shows. Although headquartered in the Netherlands Antilles, on the island of Aruba, their signal is actually uplinked from a facility in Florida. However, there are plans for an Aruba-based uplink in the works. Their schedule is also available in your programming guide.

So, contrary to the moan and groan opinion of a few, the skies don't seem to be going dark...and I have yet to see a bird swimming around in my birdbath dish. I doubt that I ever will because there's much more to come!

In an apparent effort to smooth a lot of ruffled feathers, Showtime and The Movie Channel have started a special promo feed channel. This is designed to




TV GLOBO NYC UNILATERAL TO RIO
FOR APRIL 11TH 1986 0330/0340 EST
00:30/00:40 GMT-VIA AP1/CH2
EX-ANDOVER TO TANDEM
TX LOOP 3008 TO RCA RX 1007
LIBYAN SITUATION

be used by satellite dealers in their showrooms and is an effort to bypass the still thorny issue of copyright infringement. It is believed by some that lightning will strike, and the earth will open up if a dealer shows the "real thing" in his "public place" showroom without prior permission from the movie studios and God. We won't get into the copyright issue (at least, not now), but the promo channel does show a small step in the right direction on the part of the pay-programmers. You'll find it in operation during the day, Monday through Friday, on Satcom 3, transponder 12. At times it may be scrambled, so the dealers can demonstrate the VideoCipher unit to customers.

Funny how all the guys in the black hats are now waving white ones....

Shopping networks on the birds have been sprouting up like weeds. Seems every time you scan across the satellites, you fall over another one. HSN, the Home Shopping Network, was the forerunner, and by dint of being there first, is perhaps the most successful. They now operate two separate feeds. Their first and original service is seen on Satcom 3, transponder 22. Unfortunately, that transponder is one of the weaker ones received on that satellite, at least at my home in South Florida. Their second service, HSN 2, can be found all over the place. Look for their main feed on Satcom 4, transponder 1. Additional feeds can be found on Satcom 3, transponder 2 (sharing time with The Learning Channel), and Satcom 3, transponder 16 (sharing time with the Home Theatre Network).

Loping on down the list, I've also spotted the Pratco Shoppers Show on Satcom 4, transponder 14. Evenings seem to be the best time to catch this one, as is the case with C.O.M.B. on Satcom 4, transponder 2, and Spree TV Shopping on Satcom 3, transponder 18. If I've missed any others, let me know.

A lot of the shopper channels seem to feature jewelry items of all kinds, and I wonder how many of these things they can sell to the Great American Public without running out of gas. But, that's their problem, not ours. Shopping channels are hot right now, so give them a look and see what you think.

It is believed by some that lightning will strike, and the earth will open up if a dealer shows the "real thing" in his "public place" showroom without prior permission from the movie studios and God.

A new group called Pacific Cable has announced plans to feed "alternative programming" on Satcom 4, transponder 24 (supposedly during the time when the Playboy Channel isn't occupying that slot). Their announced intention is to provide "soaps and game shows" in the afternoons. (Yawn...) However, they also plan to create some topic-oriented programs with call-in lines for viewer interaction. That might be interesting! We wish them well.

Another group known as the International Business Network has announced their intention of securing a Satcom 4 transponder to fill the time when the Financial News Network isn't on the air. Fill with what, they don't say, but that's another one to look for.

The audio subchannels are getting some new occupants too. A 24 hour-a-day radio comedy network is scheduled to debut in September on Westar 4, transponder to be announced. And our old friends at National Public Radio finally have a home they can call their own. As of the middle of June, NPR owns (not leases) its own transponder. Using Corporation for Public Broadcasting funds, they have purchased Westar 4, transponder 4. Again, transponders will be announced.

It's interesting that this brings to three the new audio services who have announced their intention to use Westar 4. The Beethoven Network, previously announced in this column, is also scheduled to start in September. Keep your ears open and tune around a bit for these three new services. Remember, an audio subcarrier must have a video channel going to light up (turn on) the transponder. So look for programs or test patterns that never go off the air, and tune those subcarriers. Let us know what you find.

Meanwhile, back at the keyboard, the Computer Distribution Net which has been holding forth at 2:45 pm, Monday through Friday, has announced plans to increase their schedule. Of primary interest to computer types, there's also a lot to see and learn about for those of us who don't know a bit from a byte. Who knows, you might get hooked too! You'll find them on Galaxy 2, transponder 5.

In other matters, the House Judiciary Committee has approved some legislation (HR 3378) that would protect networks from any use of their feeds for commercial or financial gain. (While this

Special Feeds

SHOW	TIME(ET)	DAY	SAT/TR
60 Minutes	7:00 PM	Sunday	AD/4
A Better Way	9:00 AM	Monday	S1/9
AG Day	6:30 AM	Mon.-Fri.	G3/6
Agronsky & Co.	2:00 PM	Friday	W4/19
All About Us	9:50 AM	Mon.-Fri	T1/23
America's Top Ten	9:30 AM	Tuesday	T2/21
Angie	1:00 PM	Saturday	T1/23
At The Movies	7:30 AM	Wednesday	W5/18
	2:30 PM	Tuesday	W5/18
BizNet News	6:00 AM	Mon.-Fri.	G3/12
Blk Sheep Squadron	2:00 AM	Saturday	W5/18
	1:00 PM	Monday	T1/24
Blacke's Magic	2:00 AM	Tuesday	AD/13
Brady Bunch	4:30 PM	Wednesday	T1/9
Canned Film Festival	9:00 AM	Friday	W4/18
Care Bears	4:20 PM	Saturday	T1/9
Comedy Break	10:00 AM	Mon.-Sat.	T1/9
	1:30 & 4:00 PM	Mon.-Fri.	T1/9
Comedy Tonight	10 AM(Noon & 2 PM)	Mon.-Fri.	W5/24
Computer Dist. Net	2:45 PM	Mon.-Fri.	G2/5
Cornucopia	12:30 AM	Thursday	W4/10
Dance Fever	1:00 PM	Wednesday	T1/9
Days Of Our Lives	9:30 AM	Mon.-Fri.	AD/4
Dick Clark Nite	5:30 AM	Wednesday	T1/9
Divorce Court	2:00 PM	Mon.-Fri.	T1/9
	9:00 PM	Mon.-Fri.	T1/9
	7:30 AM	Mon.-Fri.	T1/23
	9:30 AM	Mon.-Fri.	T1/9
	10:30 AM	Mon.-Fri.	T1/9
Donahue	9:00 & 10:00 AM	Mon.-Fri.	W5/15
Dressen Street	2:30 PM	Wednesday	W5/18
Ebony/Jet Showcase	6:30 PM	Friday	W5/18
	7:15 AM	Thursday	W4/11,W5/18
Ent. This Week	9:00 AM	Saturday	T1/9
	3:00 PM	Saturday	T1/23
	9:00 AM & 5:00 PM	Saturday	W4/11
Ent. Tonight	3:30 & 5:00 PM	Mon.-Fri.	T1/9
	5:00 PM	Mon.-Fri.	W4/11
Essence	9:30 AM	Saturday	W5/15
	Noon	Sunday	W5/18
Fame	12:30 PM	Monday	T1/9
	7:00 PM	Wednesday	T1/9
	8:30 AM	Monday	AD/13
	10:00 AM	Saturday	AD/7
Fiying Nun	3:30 PM	Tues.-Sat.	T1/23
Friday's	11:45 AM	Friday	W5/18
	3:00 PM	Sunday	W5/18
FTV	8:15 AM	Wednesday	W5/18
G.I. Joe (Kids)	2:15 PM	Mon.-Fri.	T1/24
	8:00 AM	Saturday	W5/15
Gidget	3:00 PM	Tues.-Sat.	T1/23
	3:30 PM	Mon.-Fri.	T1/23
GoBots (Kids)	11:00 AM	Mon.-Fri.	T1/9
Good Fishing	11:00 AM	Sunday	T1/9
Greatest Amer. Hero	6:30 PM	Wednesday	T1/9
	8:15 AM	Thursday	T1/23
Growing Pains	8:30 PM	Tuesday	AD/4
Hangin' In	11:00 AM	Mon.-Fri.	W5/24
Headline Chasers	7:30 AM	Mon.-Sat.	T1/9
Heathcliff (Kids)	2:00 AM	Tues.-Sat.	T1/23
	1:00 PM	Saturday	T1/9
Hee Haw	3:45 PM	Tuesday	W5/18
	9:00 AM	Monday	W5/16
Herald of Truth	8:30 AM	Tuesday	W5/18
Hill St. Blues	2:00 PM	Wednesday	AD/4
Hit City	2:00 PM	Tuesday	G3/12
Hot Times	9:00 AM	Wednesday	W5/18
Hour Magazine	10:30 AM	Thurs.-Mon.	W5/18
Hour of Power	Noon	Sunday	T1/9
It's A Living	6:00 PM	Thursday	T1/9
	12:30 PM	Wednesday	T1/9
It's Your Business	3:15 PM & 6:30 AM	Thursday	W5/18
Jayce & Warr.	2:00 PM	Thursday	W5/18
	5:00 PM	Mon.-Fri.	W5/18
Jem (Kids)	9:45 AM	Sunday	W5/18
Jeopardy	11:30 AM	Mon.-Fri.	T1/9
Jerry Falwell	7:15 AM	Tuesday	W5/18
	1:00 PM	Wednesday	T1/24
Jetson's	3:00 & 3:30 PM	Tuesday	W5/24
Kid's Beat	12:30 PM	Saturday	AD/4
Kid's Incorporated	11:30 AM	Friday	T1/9
	7:00 PM	Monday	T1/9
Larry Jones	11:30 AM	Sunday	T1/9
Let's Make A Deal	6:00 AM	Mon.-Sat.	T1/23
Lifestyles Rich/Fmus	11:30 AM	Tuesday	T1/9
	2:00 PM	Sunday	T1/9
Love Connection	10:00 AM	Mon.-Fri.	T1/9
Love Songs	5:45 PM	Wednesday	W5/18
MASK (Kids)	9:15 AM	Wednesday	T1/23
Melba Moore	8:45 AM	Saturday	W5/18
Merv Griffin Show	8:00 AM	Mon.-Fri.	T1/9
Million Dollar Chance	8:30 & 11:00 AM	Mon.-Fri.	T1/14
	2:00 PM	Mon.-Fri.	T1/9
Monkees	11:00 AM	Mon.-Fri.	T1/23
	9:30 PM	Tues.-Sat.	T1/23
Morning Agri. Report	6:30 AM	Mon.-Sat.	W5/15
MTV Vid Cntdn	8:00 PM	Friday	T1/9
Music City U.S.A.	10:30 AM	Tuesday	T1/23
	11:30 AM	Monday	T1/9
New York Hot Tracks	3:30 PM	Sunday	W5/18
Newlywed Game	6:30 AM	Mon.-Fri.	T1/9
Newsfeature Feeds	8:00 AM	Monday	W5/18
Odd Couple	4:00 PM	Wednesday	T1/9
	5:15 PM	Saturday	T1/23
Oral Roberts	8:00 AM	Sunday	T1/23
P.M. Magazine	4:45 & 9:10 AM	Mon.-Fri.	W5/18
	8:00 AM	Monday	W5/18
Paul Strassel's Rep.	2:30 PM	Friday	T1/14
People's Court	11:30 AM	Mon.-Fri.	T1/24
	6:30 PM	Mon.-Fri.	T1/9
	2:25 PM	Sunday	T1/23
Perfect Match	3:15 PM	Mon.-Fri.	T1/23
	6:30 AM	Mon.-Fri.	T1/23
Playboy Pri. Ticket	Noon	Tues. & Thur.	F4/8
Popples (Kids)	10:45 AM	Monday	W4/20
	1:45 PM	Wednesday	W4/20
Price Is Right	9:00 AM	Mon.-Sat.	T1/9
Pro Video News	2:00 PM	Wednesday	T1/13
Putting On The Hits	6:30 AM	Tuesday	W5/18
	3:15 PM	Wednesday	W5/18
Rainbow Bright (Kids)	10:00 AM	Monday	W4/20
	1:00 PM	Wednesday	W4/20
Rocky Mt. Inn	12:15 PM	Wednesday	W5/18
Route 66	7:00 AM	Monday	T1/9
	5:30 PM	Tuesday	T1/9
She-Ra (Kids)	5:15 & 7:15 AM	Mon.-Fri.	W5/15
Small Wonder	7:30 PM	Monday	T1/9
	5:30 AM	Wednesday	T1/23
	Noon	Wednesday	T1/9
Smurfs	9:00 AM	Saturday	AD/4
Solid Gold	Noon	Saturday	T1/9
	8:00 PM	Tuesday	T1/9
Soul Train	Noon	Monday	W5/18
Sports Look	3:15 PM	Monday	W4/11
Star Search	12:30 PM	Tuesday	T1/9
Star Trek	11:00 AM	Saturday	AD/7
Start/Something Big	8:00 AM	Wednesday	T1/23
Station Connection	3:00 PM	Mon.-Fri.	T1/14
Streethawk	6:45 PM	Saturday	W5/18
	8:00 AM	Sunday	W5/18
Strictly Business	11:15 AM & 2:00 PM	Saturday	W4/6
Switch	6:45 PM	Saturday	W5/18
Tabernacle Choir	11:00 AM	Sunday	W4/19
Tales/Dark Side	8:45 AM	Monday	T1/23
Thundercats (Kids)	7:00 AM	Mon.-Sat.	T1/23
Tough Cookies	4:30 PM	Tuesday	AD/13
Transformers (Kids)	7:30 AM	Friday	W5/19
TV Bloopers	3:00 PM	Saturday	AD/4
Ulyssis (Kids)	11:30 AM	Monday	W4/20
	2:30 PM	Wednesday	W4/20
What's Hpng Now	1:30 PM	Friday	W5/18
	5:15 PM	Sunday	W5/18
Wheel Of Fortune	7:00 AM	Tues.-Sat.	T1/9
Whiz Kids	1:00 PM	Tuesday	T1/24
Wild Kingdom	7:00 AM	Sunday	AD/7
Wk In Motorsports	8:00 AM	Thursday	W5/18
Wrestling	8:00 AM	Thursday	W5/24
Young & Restless	1:00 PM	Mon.-Fri.	AD/4

Note: The above feeds are special transmissions and are unfortunately subject to changes. STV does its best to keep these listings as accurate as possible. If you know of a special feed we've missed, drop us a card and we'll include it in our list.

is laudable, it also would effectively black out dish owners as well.) The provisions prohibiting any unauthorized reception of these feeds are part of a rewrite of the "Wiretap Statute" of 1986 passed by the Copyright Subcommittee in May. In a related issue, Hughes Television, which provides the feeds for 24 of the major league baseball teams, announced that they will be ready to scramble next year if (and it's a big if) the team owners require it. Fans will recall that the owners deferred a scrambling decision at their meeting this past spring, but are likely to review the issue again next year. Now, before you start to wring your hands, remember a lot can happen between now and next year's baseball season, so don't strike out America's pastime yet. As for the network feeds, much is likely to happen here too. Stay tuned.

With NASA's space flights still on hold, satellite owners are looking over the world for other ways to launch their new birds. France's Ariane program seemed like a good idea, until they started to have troubles of their own.

Now, according to a report, conversations have been going on with China's space agency to utilize the facilities of the China Great Wall Industry Corp. If these conversations bear fruit, new satellites could be sent up aboard Chinese rockets launched from one of the Hawaiian Islands. Speculation abounds that one of the launches could be the long awaited Westar 6-S.

We talked about this before, but it bears repeating. The lack of new satellite launches is rapidly drying up the availabilities on the existing birds. While this may not seem too apparent, commitments are piling up for the transponders already up there, and their supply will only go so far. This has also served to up the price of space on desirable birds. The situation will tighten up even more until new launches are achieved by somebody, somewhere. The next few months should be interesting indeed.

Until next time, have fun with your dish, and Happy Feed Finding! ■

The lack of new satellite launches is rapidly drying up the availabilities on the existing birds. While this may not seem too apparent, commitments are piling up for the transponders already up there, and their supply will only go so far.

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The Servo Master II Polarization Control System

by Mike L. Gustafson

Until recently there was one very large problem with multiple receiver satellite systems. Only one receiver could control the feedhorn polarization position.

All the other receivers in the system were slaved to the 12 channels that the master receiver had selected. Oh sure, you could invest your first-born child in a dual low noise amplifier and feedhorn system, but then you had no skew control for good old Satcom 3R. A low cost simple solution is now available to you in the form of the Servo Master II.

Servo Master II, a dual receiver polarization control system, is produced by Teknasat of Stockton, CA. The Servo Master is encased in plastic and has only a single terminal strip and absolutely no adjustments. The terminal strip connects two receiver polarization systems to one servo feedback feedhorn.

The design concept behind the Servo Master II is simple but the amount of electronics required to pull it off is not. In simple terms, the Servo Master votes to see which receiver gets to control the feedhorn. If neither receiver has changed its polarization signal, then the Servo Master does nothing.

The Servo Master can be installed anywhere, but if you hang it out by the antenna like I did, you should probably put it in another box just to keep the majority of the water off of it.

Once installed the Servo Master does two things rather well:

1. It allows either receiver to change polarization.
2. After 3 seconds, all power to the feed system is removed, which will add years to the life of the feedhorn motor.

The design concept behind the Servo Master II is simple but the amount of electronics required to pull it off is not. In simple terms, the Servo Master votes to see which receiver gets to control the feedhorn. If neither receiver has changed its polarization signal, then the Servo Master does nothing. If one of the receivers commands a polarization change, the Servo Master looks at the change and gives the command to the feedhorn and waits 3 seconds. At the end of 3 seconds all power is removed from the feedhorn and the Servo Master starts voting again, looking for a receiver command. With this system, either receiver can, within 3 seconds, change the position of the feedhorn servo motor.

The Servo Master is installed in about 5 minutes and only requires 9 crimp-on spade lugs. I installed my Servo Master out at the antenna with my main home

Above is the Servo Master II.

satellite system as one input and the lab system as the other input. The output of the Servo Master was connected to my Chaparral Polarotor 1 feedhorn and I was ready to test the system.

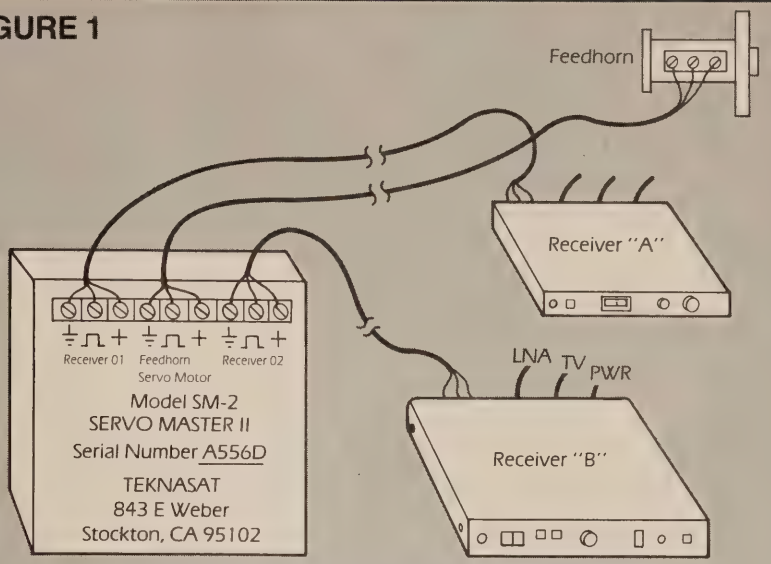
I tried out my main satellite system and could not notice any difference in the operation of the polarization system, and that is good. I next tried out a receiver that was in the lab and all 24 channesl were also available to that receiver. In fact, it is possible to continue daisy-chaining the Servo Masters together so that any number of receivers could control a single feedhorn. That is of interest to me because now I can also connect up the satellite receiver that is in my bedroom. The mind boggles!

I was curious about the fine grain adjustability of the Servo Master II so I took a raw R.F. feed off the antenna and a hand polarization controller and looked to see how well I could null out the unwanted transponders. The bottom line is that I could not see any difference in the amount of control between direct or through the Servo Master II. During the time the Servo Master was hooked up to my system, a tropical storm from the Pacific walked through the Bay area. Lots of rain and lightning and the Servo Master took a licking but it kept on ticking. (Sorry, John Cameron...)

Normally, my product reviews have sections on things I liked and didn't like about the product, but the Servo Master is so simple and straightforward that I am going to pass on those paragraphs. The Servo Master II multiple satellite receiver polarization control system does exactly what it is supposed to do. It allows multiple receivers to control a single servo type feedhorn system. The Servo Master is dirt simple to install, and there are no adjustments to mess with and get wrong. For those many home earth station users who have two or three satellite receivers throughout the house, the Servo Master II will be their answer to controlling the feedhorn polarization from all the systems. The Servo Master II may not be a better mouse trap, but it sure beats what ever is in second place! ■

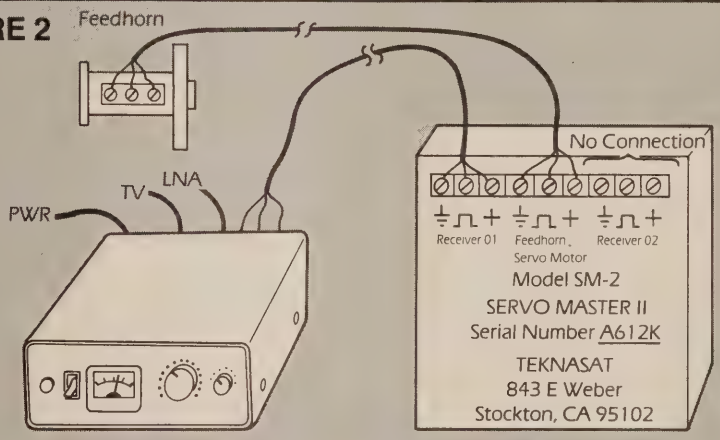
Servo Master II
Teknasat
843 E. Weber Ave.
Stockton, CA
(209) 464-5870

FIGURE 1



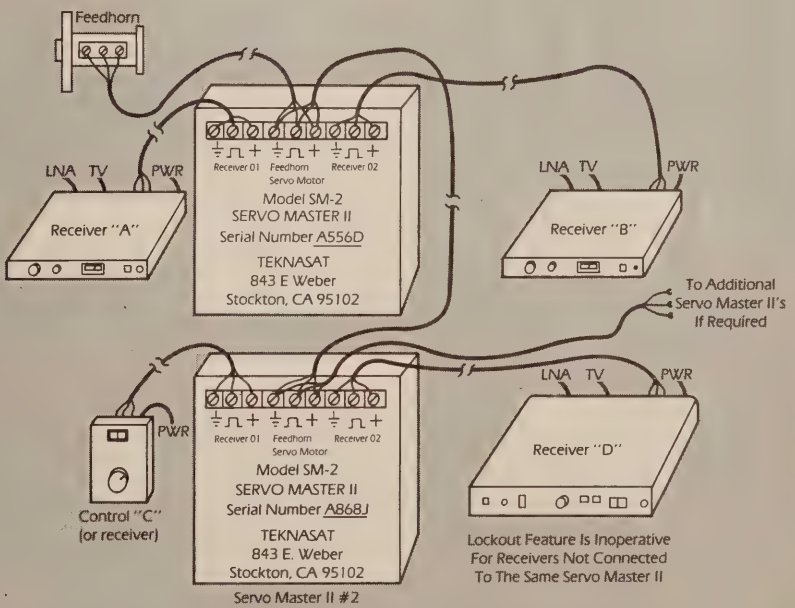
NORMAL TWO RECEIVER INSTALLATION

FIGURE 2



SERVO MOTOR "SAVER" INSTALLATION

FIGURE 3



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SYSTEMS (receiver shown, Raydx 10.5 ft. mesh dish, motor, feed/75K LNB, 125 ft. cable). All items UPS shipable and easy to install.

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Drake ESR 524	$1298	Tracker II/III	$1278
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DX 700S	$1458	Uniden 7000	$1398
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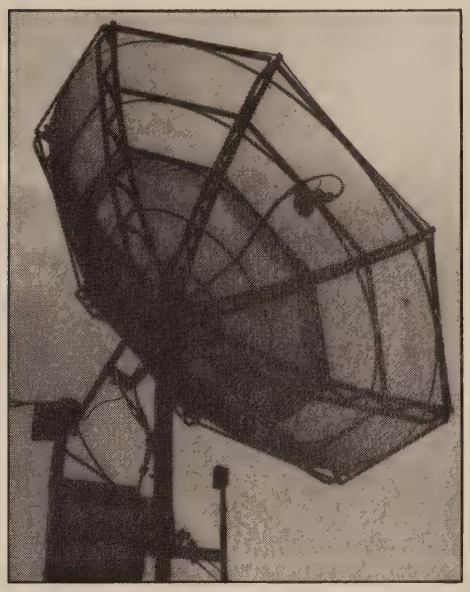
clip and save

Cooke Brews A Stew cont. from page 19

because I'll be on your doorstep in three minutes." The neighbor did as requested and met Cooke at the door with a pen in his hand.

The City of Marion, South Carolina, has approximately 100 homes in its Historic District. By the time of the Wednesday meeting, Cooke had obtained 97 signatures. Cooke was very quick to point out his appreciation of his neighbors' support. His explanation for his success in obtaining the signatures was, "When you explain to people that you're fight'n the city, they'll support you."



But the fight was not over. Regardless of the number of signatures, the final decision was in the hands of the Historic Commission. Commission member and local attorney Brice Woods explained that the biggest problem was that of not having anything to make a comparison with. "It was hard to visualize what it would look like." When the vote was taken, three members said "yes" and two said "no." David Cooke had won.

Regarding the policy now concerning dishes in the Historic District, commission member Woods said, "There is no prohibition against them. We look at them on a case by case basis." Woods continued, "I can think of no situation where if someone put their mind to it, they couldn't have a dish in their yard."

Cooke said that even with all he had been through, he still did not want the dish to detract from the historic integrity of the neighborhood. With that in mind, he went looking for the design and materials to do the job. His dealer, Dan Farrow, recommended a 12 foot UP Superior black dish with STS electronics. Farrow also included a Panasonic filter to combat the microwave problem.

As for his source of material to use in mounting, he went to a local scrap metal business. There he found a discarded pole that had been used for a service station sign. After some welding, bolting, general fabrication, and 3 yards of reinforced concrete, Cooke had a 32 foot structure complete with ladder and work platform. Because of the additional height, he only had to trim limbs from a tree in his own yard and was thereby able to avoid a confrontation with the Tree Committee. When it was all finished, Cooke had invested approximately $3000 in the system. He admitted the price would probably have been considerably higher had he not utilized materials from the 'junkyard.'

Regarding the policy now concerning dishes in the Historic District, commission member Woods said, "There is no prohibition against them. We look at them on a case by case basis." Woods continued, "I can think of no situation where if someone put their mind to it, they couldn't have a dish in their yard."

With the extra attention given to the installation, a passer-by would be very unlikely to even notice the dish...a point David makes with pride.

Since Cooke's installation, there have been no other attempts made by other Historic District residents to install satellite systems. But certainly there will be in the future. When that day comes, the people who decide to install a system should find their task much easier... Thanks to David Cooke. ■

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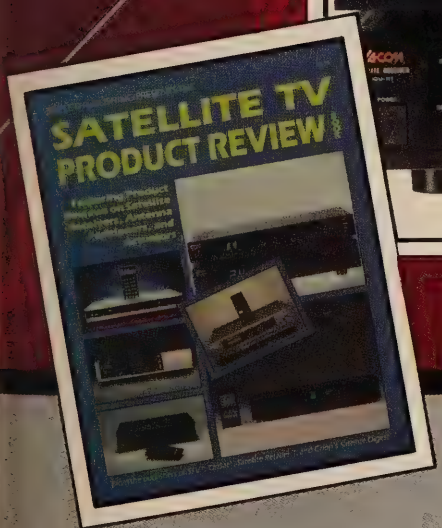

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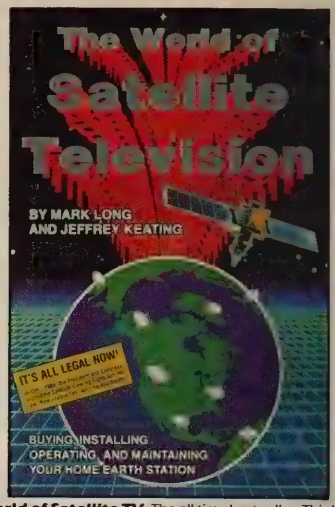
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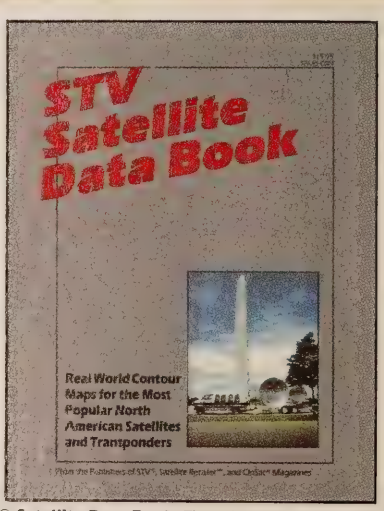

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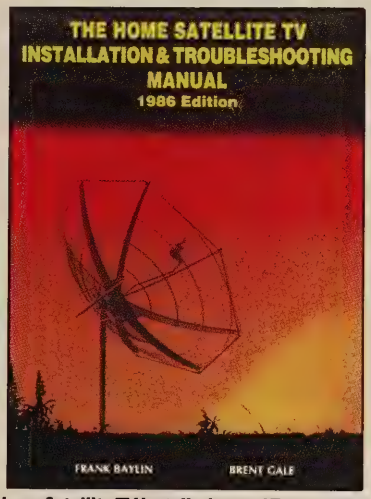

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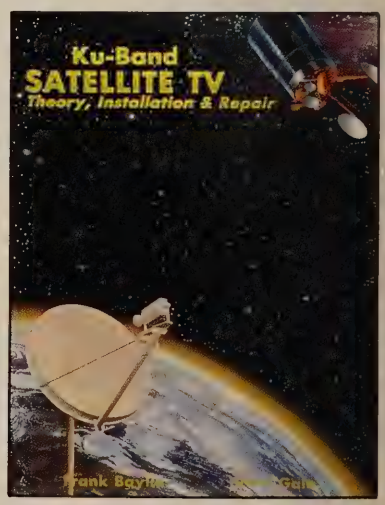

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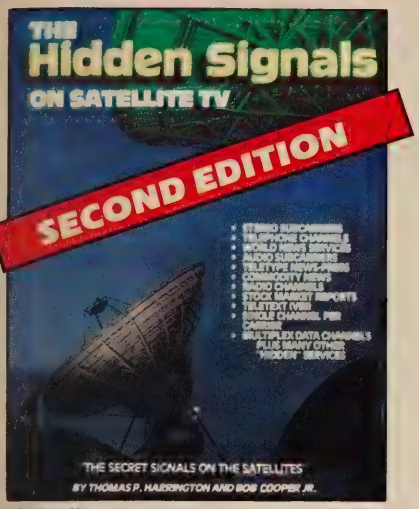

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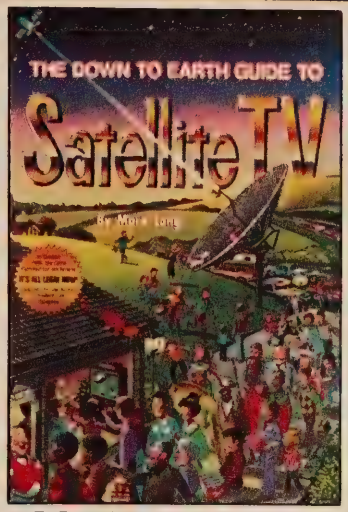

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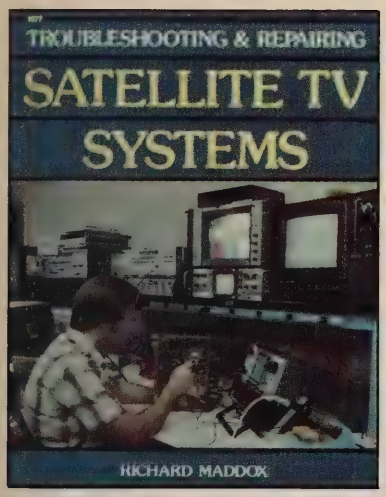

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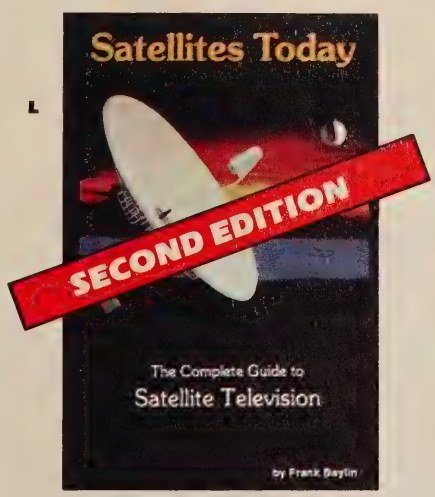

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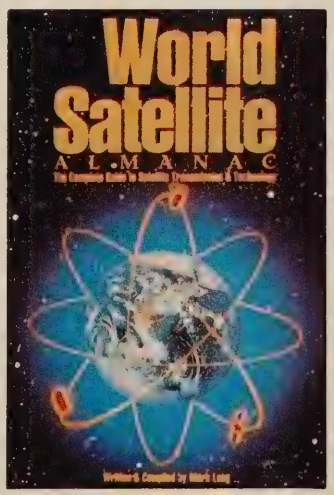

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Is Your Receiver VideoCipher Compatible?

With the advent of scrambling came the VideoCipher II. No matter how much we complain about scrambling—it still exists. Some of you will want to purchase the VideoCipher and you will need to know if your satellite receiver is compatible with the VC II. M/A-Com has provided two lists of the satellite receivers that have tested successfully with the VideoCipher.

If you own a receiver that does not appear on the following lists, don't despair, M/A-Com states that these lists are not complete. There are many more receivers that are compatible. M/A-Com offered the following disclaimer: "Inclusion on this list does not guarantee or warrant performance of all production units of a model under varying environmental conditions."

If you have any questions about the compatibility of a receiver with the VideoCipher II, please call the manufacturer. ■

This list includes receivers that are compatible with the M/A-Com VideoCipher 2000E-70 mHz IF Interface.

Amplica CSR 100
Amplica CSR 200
Amplica CSR 300
Anderson Scientific ST 4010
Avcom COM-2A (LNC RDC-11A)
Avcom COM-2B (LNC RDC-11A)
Avcom COM-3 (LNC RDC-3)
Avcom COM-3R (LNC RDC-3)
Birdview MR 20/20***
Birdview 20/20 M2***
Birdview 20/20 M3***
Birdview 20/20
Boman SR-1200
Boman SR-1500
Boman SR-2500
Channel Master 6129
Channel Master 6130
Channel Master 6131
Channel Master 6134
Channel Master 6138
Chaparral Sierra*
Drake ESR 24**
Drake ESR 224**
Drake ESR 240**
Drake ESR 240A
Drake ESR 324
Drake ESR 324 Block System*
Drake ESR 324 S Block System*
Drake ESR 424 Block System*
Drake ESR 524 Block System*
Drake Black Widow Series I**
Drake Black Widow Series II*
Earth Terminals
GCI 8300
Houston Tracker System V
Intersat Baby Q
KLM Skyeye X
Lowrance System 70X
Luxor 9550
Pico CR 1000
Pico HR 1000*/**
Prosat 315 (LNC P-511)
ProSat 330*
SatStar Elan
Sat Tec R-5000
Sigma-Vu Mark IIA
Sigma-Vu Mark III*
Sigma-Vu Mark V*
STS MBS-SR
Toki TR220
Uniden UST-1000
Uniden UST-3000
Uniden UST-5000*
Uniden UST-6000*
Uniden UST-7000*
Vector BSR-4000
Wilson YM400
Wilson YM450
Wilson YM1000
Winegard RF-1000

*Compatible with receiver 70 mHz IF loop.
**These units were not tested. The manufacturer certifies there are no electrical differences between this unit and a similar model that was already tested and approved.
***These units require factory authorized modification or adjustment for proper operation with the VideoCipher II.

This list contains those receivers that are compatible with the M/A-Com VideoCipher 2000E/B and 2000E-Composite Video Interface.

Arcfinder 2000
Brooks B-250
Brooks B-250A
Channel Master 6135
Channel Master 6137
Channel Master 6144
Drake ESR 424 Block System
Drake ESR 524 Block System
Drake ESR-924i
DX Communications DSB-600
DX Communications DSB-600A
DX Communications DSB-700
DX Communications DSB-700A
DX Communications DSB-700S***
DX Communications DSB-800
General Instrument SRX-207
Janeil BCR-2000***
Janeil BCR-5000
Kenwood KSR-1000***
Luxor 9570
Luxor 9900
Luxor 9995
M/A-Com H-1
M/A-Com T-1
M/A-Com T-2
M/A-Com T-6
Norsat JR-100
Norsat JR-200
Norsat XT-100
Norsat XT-200
Panasonic C-1000
Panasonic C-2000
Panasonic C-2000A
Panasonic Ku/C-6000
Radio Shack SR 2010
Radio Shack TDP 900
Sat Tec R-5100***
Scientific-Atlanta Homesat 800
Standard MT800-Agile Omni
Uniden UST-5000***
Uniden UST-6000***
Uniden UST-7000***
Zenith ZS-3000

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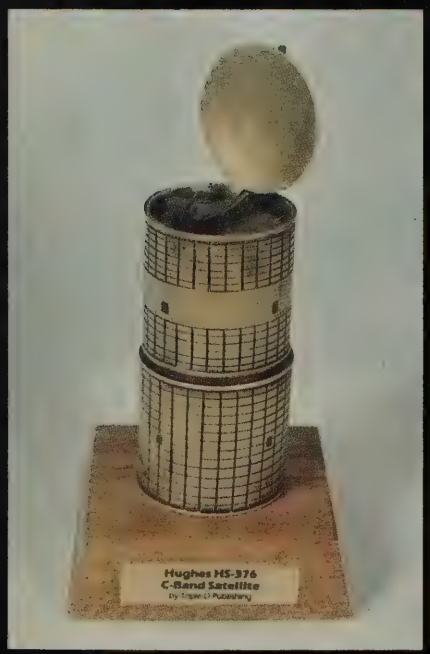

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Drake ESR 924i Integrated Receiver And Antenna Drive

by Mike L. Gustafson

If you are a car nut, then you will no doubt recognize the number on the new R.L. Drake Company satellite receiver. The ESR 924i is Drake's new entry into the top-of-the-line integrated home earth station satellite receiver and antenna positioner market. Prior to the 924i, receiver and power drive systems from Drake were housed in separate boxes. What do Drake and cars have in common? Not much really. BMW uses a very similar numbering system for all of their cars, with most of them ending in an "i." The association between Drake receivers and fast low-slung BMW sports cars is probably intentional.

The ESR 924i is manufactured by Toshiba in Japan and imported into the US by the R.L. Drake Company. Drake set the design criteria and Toshiba provided the offshore manufacturing facility. The 924i is a microprocessor controlled frequency synthesized block receiver. The first intermediate frequency used by the 924i is the 950 to 1450 mHz. The second IF in the 924i is 140 mHz which is looped out the rear of the receiver. This last point, the 140 mHz loop-through, will come in handy if you need to use terrestrial interference filters. Like most high-end systems, the Drake 924i includes as standard features, a complete function infrared remote control, dual audio bandwidths and stereo demodulators, C-band and Ku-band operation, parental lockout, an integrated antenna positioner, and outputs suitable for decoder operation.

The front panel of the Drake 924i is dominated by 15 indicator lights that show the status of most of the receiver functions. Signal strength is displayed by a light bar graph that is located in the center of the panel. Video channel and satellite name and number are displayed on two alphanumeric readouts on the far right side of the panel control channel selection and satellite selection.

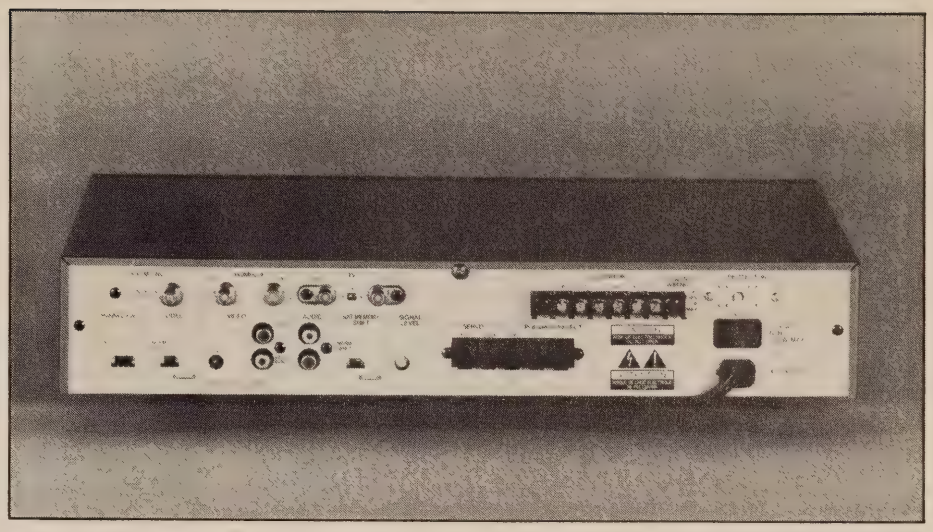
Once the receiver is installed and programmed, the two buttons on the right side of the front panel and the remote control are all that is required to operate the receiver.

All of the important programming functions and controls are hidden behind a flip-down door located on the left side of the front panel. Once the receiver is installed and programmed, the two buttons on the right side of the front panel and the remote control are all that is required to operate the receiver. The

flip-down door keeps the important controls away from prying fingers.

The rear panel has all the normal audio and video connections for color monitors, VCR's and TV sets. Also located on the rear panel are the connections for the antenna actuator and feedhorn polarization systems. There are a few special features located on the rear panel such as a spare 110 VAC outlet and circuit breaker which will come in handy if your media center is at all complicated. The 140 mHz second IF loop-through, satellite memory shift, video invert, and channel calibration switches are also located on the rear panel. The satellite memory shift switch is used to offset all of the actuator memory positions to account for possible polar mount problems. The video invert switch and channel calibration switch are used during Ku-band operation.

The remote control that comes with the Drake 924i receiver contains every control that you could possibly use during normal operation of the system. The most interesting buttons on the remote are the 'Priority View' buttons. These buttons can be programmed with the satellite, transponder, and audio information for nine of your favorite channels. One push of any of the buttons recalls that satellite information and the receiver and antenna drive respond appropriately. Really a one touch control!



Shown above is the rear panel of the ESR 924i.

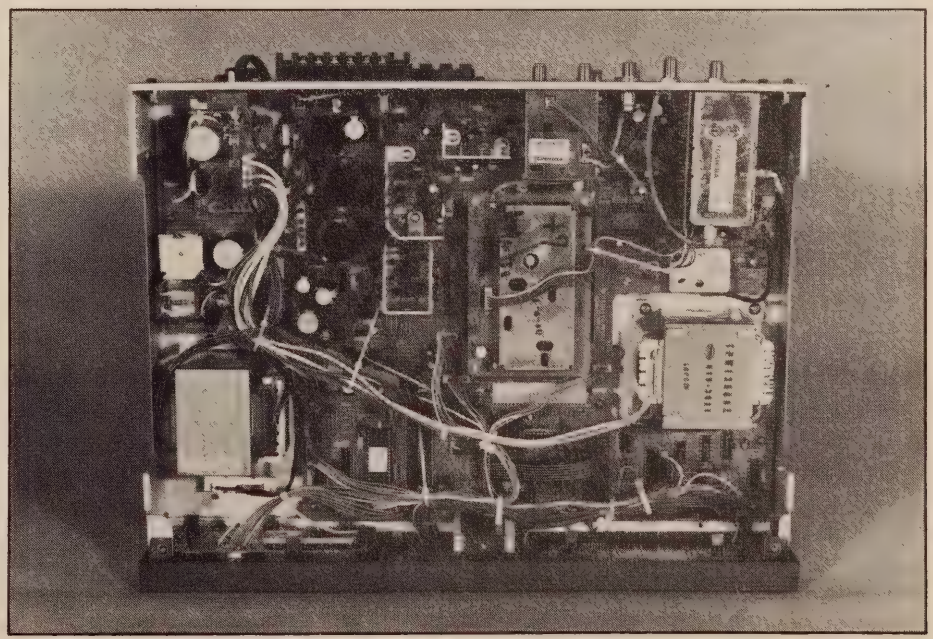
Installation

The first step in installing the 924i receiver is attaching the actuator to the antenna. The 924i can use any 36 volt DC actuator with either a Reed Switch, Hall Effect, or Microswitch Sensor. The manual that comes with the 924i does not cover the actuator installation. It is assumed that this portion of the installation is covered by the actuator installation manual. Let's hope there is one.
After the actuator is hung on the polar mount and antenna, the low noise block downconverter is installed on the feedhorn. A single RF coaxial cable is run between the LNB and the receiver. You should be sensitive to the type of cable used versus the length of the cable. The longer the cable run between the LNB and the receiver, then the higher quality of cable should be used.

A 3 conductor cable is run between the feedhorn and the polarization control connections located on the rear panel of the receiver. Last, a 5 conductor power cable is run between the actuator and the receiver. Two of the conductors in the power cable are for the motor, and the rest are for the feedback position sensor.

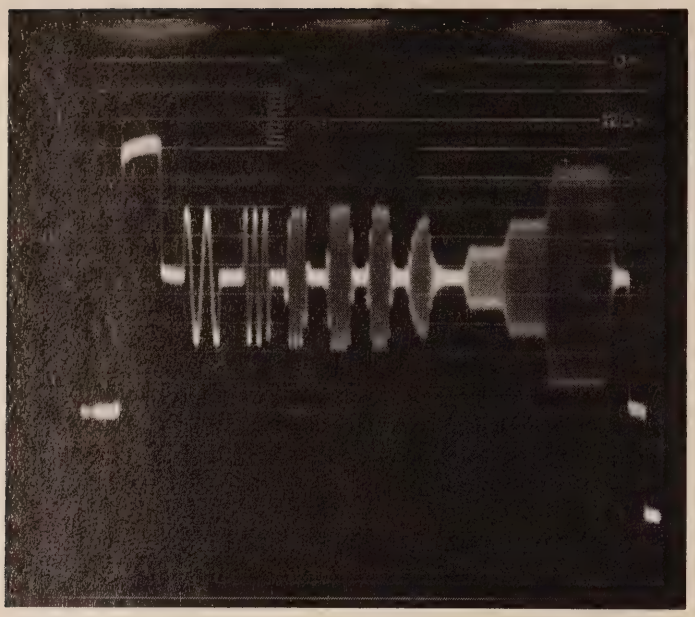
The first operational test is to make sure the antenna moves in the correct direction when the east or west buttons are pushed on the receiver. With a friend out at the antenna, push the east button and the drive should move east. If it does not move at all, then the receiver is not getting the pulse count back from the actuator. Check that you are using the correct connections for the type of sensor in the actuator. Assuming that the drive moves, but moves in the wrong direction, reverse the large conductor connections either out at the acutator or at the receiver rear panel. With the antenna moving in the proper direction the system is ready to be programmed.

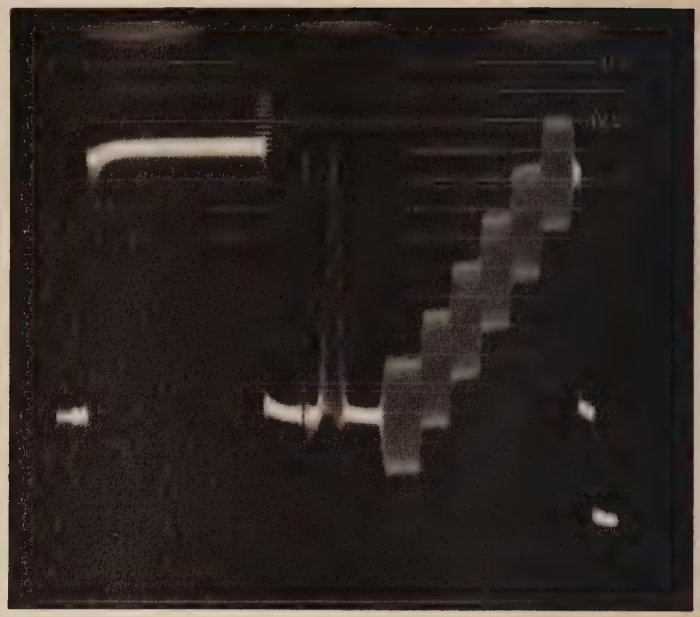
The first step is to program the east and west limits into memory so that you don't run the antenna over into the house or the ground. Once the limits are set, the outside man, or woman, can come into the house to watch you do your satellite location thing. You don't have to



Above are the inside components of the receiver.

Pictured here are typical frequency response patterns of the Drake ESR 924i.





program the satellites in any order, just find a satellite, identify it, give it an alphanumeric name for the 924i to remember, and you are done. While you are programming in the satellite position and feed polarization information for each satellite, you might also want to set in the audio format and use one of the nine priority view buttons to store that information for one touch retrieval. With all of the satellites located and programmed into memory, and the priority view buttons programmed, you are ready to sit back and enjoy the fruits of your labor. The last button you push on the receiver is the 'auto' button which concludes the programming part of the installation.

Operation And Subjective Evaluation

I found the audio and video quality of the Drake 924i receiver to be quite good. Recalling satellite positions was as easy as pushing the satellite button until the satellite name of interest was displayed. If you stopped on a satellite name for longer than a second or two, the drive would take off and head for that satellite. As the drive was running, the polarization format and skew information was sent to the feedhorn by the microprocessor. If you were recalling a satellite by the use of the priority view button, even the audio information and video channel stored would be dialed up as the drive did its thing.

The audio bandwidth and stereo system was tried out on MTV and C-Span which represent the two extremes in audio deviations. MTV sounds best in the wide mode and seemed to have excellent audio fidelity and signal-to-noise ratio. C-Span has many narrow subcarriers that tax most audio systems to properly demodulate. In the narrow mode, all of the audio signals to C-Span were clean and clear. I pronounced the stereo audio system in the 924i a success at the end of my audio tests.

The 924i was tried out on Ku-band and with the help of the video invert switch and the channel offset switch, I was able to tune in all of the video channels across the 12 gHz satellite arc with the 924i. I did notice two problems with Ku-band operation. The channel numbers displayed on the receiver are not correct for the channel being viewed. In some cases, the video deviation was low so the video level was a mite dim. Not a big deal, but a point or two worth remembering as you tune across Ku-band channels.

The audio bandwidth and stereo system was tried out on MTV and C-Span which represent the two extremes in audio deviations.

My VideoCipher decoder was connected to the Drake 924i and as I expected, both units performed perfectly. In fact, I signed up for The Movie Channel and had my decoder authorized while it was connected to the Drake receiver.

Things I Would Like To See Added Or Changed On The ESR 924i Receiver

During the subjective portion of the product evaluation of the 924i, I noticed a few items that are worth mentioning. The drive was a little too quick off the line when I was stepping through the stored satellites. If the signal from the remote control missed the receiver as the buttons were pushed, the drive took off, often in the wrong direction for the satellite I was looking for. The up-side of that problem was that I could continue hunting for the satellite I wanted and when I found it, the drive would stop and go after the new satellite.

I would like to be able to program audio information as a function of satellite name and position. The only way you can do this with the 924i is with the priority view buttons, of which there are only nine positions available.

The automatic frequency control or AFC cannot be disabled which can be a problem if you are trying to operate the receiver in a high terrestrial interference environment. At least the second IF of 140 mHz is looped out the rear of the receiver so low cost filters can be used if you do encounter TI.

The manual that comes with the 924i has all of the information you need to set up the receiver but it is a little shy of hav-

ing all the information that ties the total system together. I refer to the lack of information on how to install the actuator. I also found a misprint in the manual under the section on programming the priority view buttons. The manual asks you to push the 'mode' button as the first step. Actually you want to push the 'auto' button. A small detail but it did cause me about 30 seconds of head-scratching.

The last point that bothered me was that the receiver did not have direct access channel tuning. In order to go from channel 12 to channel 24, you had to tune up or down 12 transponders. I admit that I could tune through those 12 transponders as fast as I could punch the button, but I would still like to go direct to the channel if possible.

Things I Like About The Drake ESR 924i Receiver

The good quality video was made possible by the use of a 27 mHz wide SAW filter. If the channel was centered in the filter, then the video was clean with no color dropouts or tearing. The priority view system was nice to use and made jumping between your favorite satellites a snap. I ran the drive system between Satcom 4 and Galaxy 1 about 30 times and could not detect any mispointing problems caused by actuator drift. In all the messing around that I did with the receiver as I put it through its paces, I found the 924i easy to use with no bad habits.

Conclusion

In any product review, there is a trade-off between good points and bad points. It is always assumed there are more good points than bad points or the product would not have seen the light of day. The Drake ESR 924i integrated receiver is the culmination of all of their prior receiver designs. They took the good points from their older designs, added a microprocessor and power drive, and the result is the 924i. If you take a look at the consumer data sheet you will notice there are a lot more good points than bad points with a final score of 84 percent.

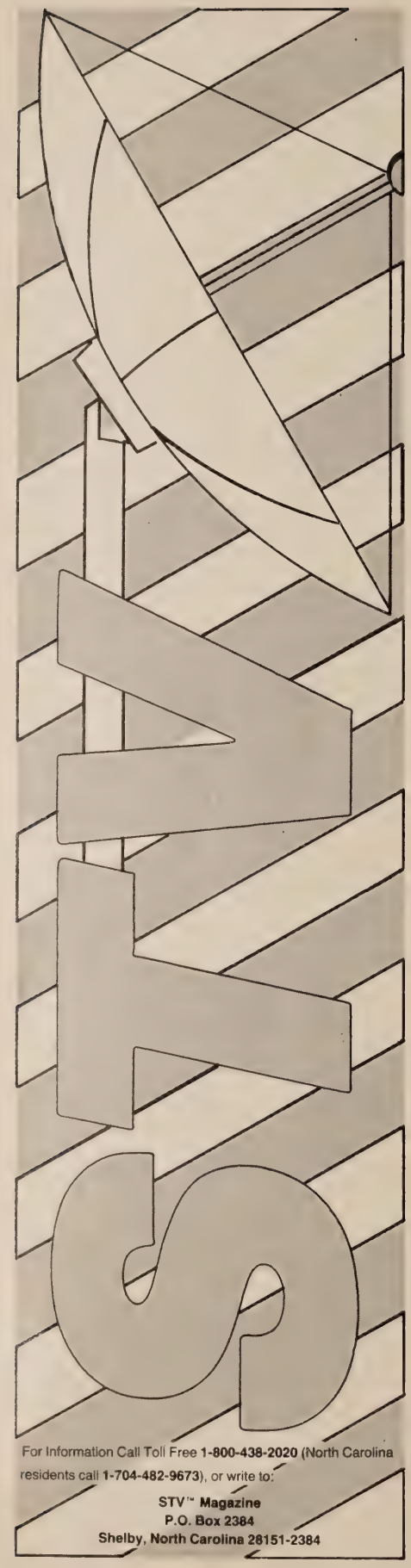
R.L. Drake
540 Richard St.
Miamisburg, OH 45342
(513) 866-3211

CONSUMER DATA SHEET
DRAKE ESR 924i RECEIVER

Excellent	Good	Fair	Poor
VIDEO SIGNAL-TO-NOISE RATIO			
(45-48 dB)	(40-44 dB)	(35-39 dB) ✓	(<35 dB)
PICTURE QUALITY			
	✓		
VIDEO FREQUENCY RESPONSE			
(+/−1.0 dB) ✓	(+/−2.0 dB)	(+/−3 0dB)	(>3 0 dB)
VIDEO THRESHOLD			
(<7.0 dB)	(<8 0 dB)	(<9 0 dB) ✓	(>9.0 dB)
IF BANDWIDTH			
(>30 MHz)	(27-30 MHz) ✓	(24-26 MHz)	(<24 MHz)
AUDIO DISTORTION			
(<1.0%) ✓	(1.0-1.5%)	(1 6-2.0%)	(>2.0%)
AUDIO SIGNAL-TO-NOISE RATIO			
(>47 dB) ✓	(44-46 dB)	(40-43 dB)	(<43 dB)
AUDIO FREQUENCY RESPONSE			
(100-15KHz) ✓	(400-12KHz)	(800-10KHz)	(1k-8KHz)
BLOCK DOWNCONVERTER			
Type—Block			
Intermediate Frequency 950-1450 mHz			
LOCAL OSCILLATOR LEAKAGE			
(<−60 dBm)	(<−40 dBm)	(<−20 dBm) ✓	(>−20 dBm)
IMAGE REJECTION			
(<−20 dBc) N A	(−15−20 dBc)	(−12−15 dBc)	(>−12 dBc)
FREQUENCY STABILITY			
(<1 0 MHz)	(1-3 MHz) ✓	(4-6 MHz)	(>6 MHz)
OPERATING FEATURES			
✓			
USER'S MANUAL			
	✓		
EASE OF INSTALLATION			
✓			
ANTENNA POSITIONER			
Installation			
✓			
EASE OF SATELLITE POSITION PROGRAMMING			
✓			
POSITIONING REPEATABILITY			
✓			

OVERALL SYSTEM SCORE

Excellent	Good	Fair	Poor
	✓		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News

Lawsuits Filed

Oak Industries, Inc., has filed a lawsuit against M/A-Com Linkabit, Inc., charging that three of their patents have been infringed upon. The suit seeks immediate and permanent injunction against further sales of the VideoCipher II. Titles of the patents named in the suit are: "Selective Coding System for Subscription Television" (issued in January 1974); "Coding and Decoding for Video and Audio Signals" (issued in January 1984); and "Multi-Layer Encryption System for the Broadcast of Encrypted Information" (issued in July 1985).

Separate suits have also been filed by Oak against General Instrument Corp. and GTE. Each of these companies is charged with infringement of one patent; no injunctions were sought. The patent named in these suits is "Selective Coding System for Subscription Television," issued in 1974.

Scrambling Delayed

The USA Network and MTV Networks (including MTV, VH-1, and Nickelodeon) have rescheduled their scrambling plans. USA, originally slated for the fourth quarter of 1986, will scramble in early 1987. MTV will move from the second quarter to the third, or possibly fourth, quarter of 1986. The delays will allow cable affiliates time to install headend decoders.

Investment In Discovery

Telecommunications Inc. (TCI), United Cable Television Corp., Cox Cable Communications Inc., and Newhouse Broadcasting Co. plan to invest heavily in the year-old Discovery Channel. Discovery (Galaxy 1, transponder 22, 3:00 pm) transmits its services 12 hours each day. Plans are to increase this to 18 hours by January 1, 1987. Presently unscrambled, The Discovery Channel plans to encrypt its nature/science/technology/world exploration programs sometime in 1987.

Viewer's Choice Launches 2nd Channel

A second satellite channel was added to Viewer's Choice, the nation's leading pay-per-view service. The new service, Viewer's Choice 2, can be found on Galaxy 1, transponder 16. The scheduling format for the new service will be the same as for Viewer's Choice 1, which begins a new film each Wednesday and runs it for one week. Half the time on the new channel will be given to running blockbuster films from Viewer's Choice 1 for an extra week; the rest of the programming will be new titles. Additional information can be secured from Viewer's Choice at (212) 708-1600. ■

Chip Ganassi cont. from page 39

compare notes on what is up there; the people around who don't have one, just can't figure out what we are talking about."

Ganassi's system was initially installed with a 10 foot beige, four section, fiberglass reflector. This was connected to a Drake receiver and Houston Tracker IV actuator. Special consideration was given to the antenna foundation as the entire site consisted of landfill. To insure a firm footing, the installation crew dug down 12 feet to reach solid ground. A 12 foot column of concrete was poured and topped with a 4-foot by 4 foot pad. The current Winegard 10 foot perforated aluminum dish is bolted to the pad. Landscaping was done around the dish with the addition of several pine trees and shrubs, carefully positioned to block the view of the dish from the street, but allowing a clear view of the satellite belt.

The receiver now in place is a Houston Tracker V with the matching actuator. The single remote unit is a big plus over the two individual controls the old system required. The receiver's output feeds a Jensen 25 inch monitor, stereo amplifier, and Advent speakers. Total remote control is possible, and the terrestrial television receiver that complements the Jensen video monitor allows tuning of FM radio broadcasts. Chip especially likes this feature when he watches the Steelers and listens to local color commentary. (Jensen was one of Chip's sponsors in 1983 and 1984.) Top quality components provide an excellent system, and he has not regretted the investment. Chip insists that cable television can't compare to satellite reception.

"I work off-season for my father, then in February I start driving again. I go to Daytona for the 24-hour race, Miami and Sebring in March. The Indy car season starts in April.

"I don't have much trouble with other people wanting to watch my system. When I'm here I watch what I want, and when away, my father is usually with me at the races. My mother doesn't want to watch the races, even though she could see every race right here on my set. I guess she just doesn't like to watch automobile racing. You know how mothers are..." ■

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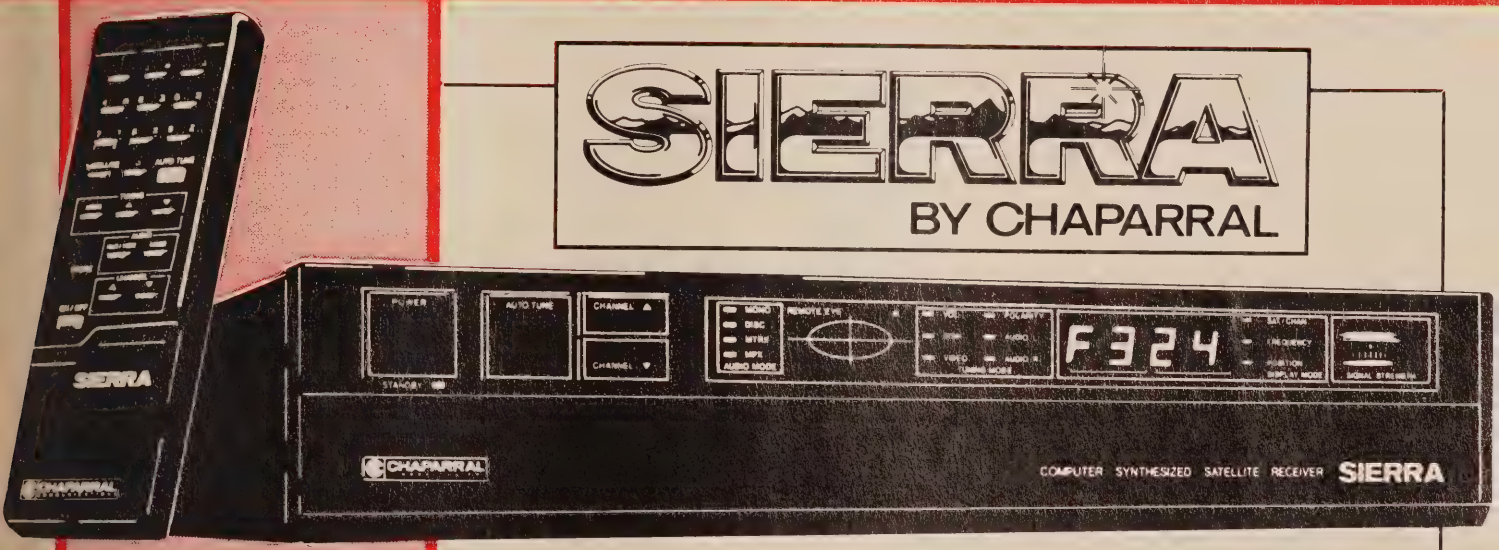

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Too Much/Too Little

Dear **STV**,

Sometime back, I read of the solution to my problem in your excellent magazine, but I can't find it now. I have a Commander 8 foot spun aluminum dish, an STS block receiver (MBS-SR), an 85 degree Lo-Com LNA, and a 210 foot run of RG6 (copper braid shield) from the dish (downconverter) to the receiver. The dish is fine tuned and reception at the dish is nearly flawless with the signal strength meter almost topped out. Meanwhile, inside the house the pictures are somewhat deteriorated, some more than others, and the signal strength meter is down about two notches.

In an earlier issue, you mentioned a 10 dB in-line UHF amplifier available from Radio Shack that would greatly help this difficulty at a reasonable cost ($10-$15, I believe). Radio Shack outlets don't seem to know anything about this, and local dealers say, "A bigger dish, or move it closer,"—two simplistic solutions that say they don't know what I'm talking about. The Phantom IFP34 appears to be a solution (?), but quite expensive.

My house is surrounded by woods so moving the dish is not a consideration and a large dish is too expensive too consider. Besides, the 8 foot does work!

I am a Math teacher not an electrical technician, so please advise me in a simple direct manner (if possible). What do I need? Where do I get it? How do I install it? Our whole family anxiously awaits your learned and valued response.

Thanking you in advance for your prompt and helpful response.

Sincerely yours,
Thomas D. Norris
Wheatfield, IN

Your problem is too much cable and not enough signal. Since you can't move the antenna closer, you have to amplify the signal before it arrives at your house. A 10 dB line amplifier, about halfway along the 210 feet, should do the trick. In fact, you might try it at your receiver first, to see if that will work. It probably won't, so you will have to dig up the cable and cut the RF cable, install a couple of F connectors and drop in the amplifier. No big deal really, just make sure you get the connectors installed correctly. The line amp is available from STS or any local dealer or distributor.

Trash On G1?

Dear **STV**,

I am having a problem with some trashy transponders on G1 and F3R (speckles in the bright colors). However, the further in declination the dish climbs towards F2, the better the picture gets on all transponders. This deterioration has become worse since my dish was installed seven months ago. Is it possible the entire dish could need realigning? If I were to put a protractor on the mount, what should it read? My system includes a Uniden 7000 receiver and a UFI 10 foot fiberglass dish. Since I use a 25 inch monitor/receiver as a family TV, you can no doubt see my problem even with slight speckles. In closing, may I also ask that you run an article on grounding dishes before thunderstorm season?

Thank you,
Ben Stansberry
Yadkinville, NC

Ben, it sounds like you have the problem all figured out. Yes indeed, the antenna is in need of realignment across the whole satellite arc. There is no good reason why Galaxy 1 should have any noise in the picture at all. The amount of power coming from G1 in your location is enough to insure clean video. You can test out our theory by putting the antenna on G1 and adjusting the elevation control. If the picture gets better then we are right, if not then it is back to square one. I am betting on antenna tracking.

Where, Oh Where Is CKAC?

Dear **STV**,

The Audio Services section of your Transponder Service Watch lists the French language radio station CKAC-AM on AD,14 at a frequency of 5.41 in the monaural format. I have an Intersat Baby "Q" receiver which gets monaural format perfectly, but I do not find CKAC as listed by your guide. I get another monaural Canadian station in English from the Yukon at 5.41 on AD,23. Is there any technical reason why I would not be able to get the same frequency on transponder 14? If your listing is in error, would you kindly publish the correct location? In this event, perhaps Bill Barr, whose column I read avidly, could help you locate the feed.

Thank you for you kind attention to this problem. Your magazine is my favorite subscription.

Regards,
M. Roy Farris
Charlottesville, VA

My first problem is that I don't have an Oak decoder for that transponder and it is scrambled. I checked with two other program listings and they all show CKAC on that transponder at 5.41 mHz. If it is not there on your equipment, then it is probably not there and we don't have the foggiest notion where it is really located. Maybe one of our Canadian readers will take pity on us and let us in on the secret.

Busy Signal—No Parts

Dear **STV**,

I'm a small dealer in Riverton, Wyoming, having a problem with Uniden. We sold a number of their UST-110 dishes and have had problems with parts breaking. The antenna actuator brackets and actuator mounting brackets seem to have problems in windy areas. I realize that there can be problems with anything, all I ask is to get the replacement parts. (The dishes are under one year old.) I have called repeatedly and talked to different people. The last person was a Brenda on 5-16-86. She told me she would get the parts out immediately. This must be a standard answer because I have been waiting three months. I've written letters to the parts department also. That doesn't work either. Their service phone number is

(317) 842-1036. One line in for as many thousands of components as they've sold. It's nearly impossible to get anything but a busy signal. I would appreciate it if somebody in your department could help me because I have a lot of angry customers.

Thanks,
Mark Lucht
Riverton, WY

I had no luck getting through on that number either. I called Uniden and talked with Jim Holtel, who told me that they have a new service number—(317)842-2483. Jim took your name and address and promised to contact you right away. Most manufacturers are eager to maintain a good relationship with their dealers; Uniden should be no exception. Let me know if they solve your problem.

LNB Woes

Dear **STV**,

I have been an avid reader of your magazine since installing my system last December.

I would like to know if your technical department can give me an answer to a problem I have been having with my system.

I have a Uniden 7000 receiver, a 10 foot Orbitron Dish, a Chaparral Polarotor, and an Aventek LNB.

My problem is that when I turn my receiver on, and sometimes while it is operating, I lose the video and audio. It is as if I lose the signal or the polarity is wrong. By switching the dual V/H and single +18v switch back and forth it cures the problem. It is normally on +18v as I have a single system.

I'm not quite sure what I am doing when I switch this switch from +18v to dual feed—then back again.

Thank you for your help.

Joseph Picerow

Joseph, it sounds like your problem is with the Aventek LNB. Either it is just plain quitting or it is breaking into oscillations. You might ask your dealer to loan you a spare LNB to try out for a while to see if that cures the problem. The only possible answer is that the Uniden receiver power supply is acting up. Messing around with the switch on the rear panel just slaps the receiver around a little bit and gets its attention. ■

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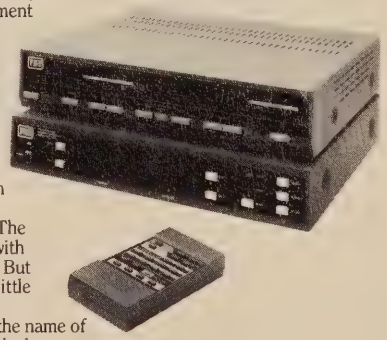

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Consumer Problems

Back In The Saddle

Dear **STV,**

I really enjoyed and learned from your Technical Tips article. It was very informative and provided me with an answer to my own problem.

I have two Uniden 1000 receivers, because the first one was fried by a lightning bolt. I bought another but subsequently replaced a few resistors and diodes in the first, and it works very well now. Your news of expanding to multiple tuning locations was the greatest thing since TVRO. My problem with which I hope you may be able to help is—I can't locate the BDT 1200!

I have called at least five distributors and many dealers and they all tell me Gensat is defunct and therefore they don't carry it and do not have the BDT in stock. Do you have any idea where I might try to buy one?

Keep up the good work.

Jim Craig
Edgewater, FL

Gensat did close up shop, but Sam Singer has brought the company back to its feet and it is now called GFA Technologies Inc. Their address is:

951 Alness St.
Downsview
Ontario, Canada M3J 2J1
(416) 736-6460

Ku Happy

Dear **STV,**

For the readers who were caught up in the USCI fiasco, the following might be helpful.

You can receive Ku-band transmissions on SBS-3. I haven't attempted to locate others yet. The audio portion is on subcarriers, but you can purchase a compatible audio tuner (manufactured by General Instruments) from Davis Antenna in Maryland at (301) 645-5474.

SBS-3 is at 95 degrees west. On your USCI equipment use channels 04, 15, 24, 35, 44, 53, 63, 72, 83, and 94.

I would like to hear from other Ku-band enthusiasts. Call (215) 257-6940 or write to the address below.

Thanks, STV.

Bill Wardino
206 Parkridge Road
Perkasie, PA 18944

Thanks for the information on USCI. You will probably hear from several Ku enthusiasts.

Needs Review

Dear **STV,**

I have an STS MBS-SR block satellite receiver with remote control, MBS-AA actuator with a 10 foot Winegard perforated dish. I want to know as much as possible about my equipment from a technical point of view. Check your files and see if you have some information that will help me. I would be glad to cover the expenses.

Sincerely,
Santo A. Anderson
Jacksonville, FL

Both the STS receiver and the Winegard antenna have been reviewed in STV; the receiver was reviewed in December 1984, and the antenna in December 1985. We are sending you a copy of each of these product reviews at no charge.

High Performance Receiver

Dear **STV,**

My TVRO system consists of a 12 foot Paraclipse antenna, a 55 degree Hy-Tek LNA, and a Sat-Tec R5000sp receiver. I would like to upgrade my system with a modern, high performance receiver. My choice for this receiver will be determined by the following guidelines:

1. It must be made in the USA.
2. It must be a high performance receiver as outlined on page 12 of the June issue of STV.
3. It must be Ku compatible.

Along with your suggestion(s), could you give me any information on the Wheatfields "Vision" receiver? Your help is greatly appreciated.

Thank you,
Richard Miloro
Glen Burnie, Md.

Oh boy, nothing like putting me on the spot. I would suggest that you take a look at some of the recent product reviews for your new receiver. Unfortunately, none of them are made in the US. Even your R-5000 is made in Korea, so why is it so important to restrict your choices? STV has not done a product review on the Wheatfields "Vision" receiver, so I can't comment on it either way. Ninety-five percent of all consumer products are now made overseas so it is going to be tough to find what you are looking for.

Ku-Band Hungry

Dear **STV,**

I look forward each month to your articles evaluating different receivers, lifts, etc. I've been following your Ku-band and C-band articles and find by getting involved, it's hairy. I have an 11 foot mesh in my backyard and find even though it's great on C, it stinks on Ku. I am beginning to see where Kaul-Tronics with the 10 foot stainless may still be the way to go. A friend (and competitor) and I have spent the first of this week with different receivers—a DX to start with, which will have to be worked on to be compatible with the Chaparral/Panasonic Ku feed because of inverted video and no switch and 900-1400. Next was a M/A-Com unit which goes hunting for the best signal and finally, my Sierra which had to have the video inverted by advanced functions. And if you lose the instruction sheet as I did for a while, it can get frustrating.

While playing with the Sierra, I got out the first receiver I ever bought, an Amplica Rk-20 remote control 70 mHz IF. By taking the 70 meg loop off the Sierra and running this into the Amplica 70 meg in, we got good Ku-band reception. May be a way you might want to look at for a future article updating an old RX (for experimenters).

Again, I enjoy your articles. Keep them coming.

Sincerely,
Robert Haskett
Millington, TN

You really want your Ku-band signals, don't you? Boy, two receivers to get one picture, doesn't sound fair does it? I will keep your technique in mind for some future articles. But you did confirm what I have been saying all along, and that is, the simplest receiver is best on Ku-band.

■

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AA-2

• Services OnSat Carries — Transponder

USE THE SPACES BELOW TO JOT DOWN YO

TRANS H/V	F2 72° W Satcom F2R	F4 81° W (83°) Satcom F4	T2 85° W (87°) Telstar 302	T1 97° W (96°) Telstar 301	W4 99° W Westar 4	AD 104.5° W Anik D
1		• **HSN 2** 6.2 & 6.8 MN	Occasional Video			**Network 5** (Coming Sept. 1)
2	Occasional Video	• **Bravo** -6.8 MN / 5.8 MX **C.O.M.B. / Book Channel**	Occasional Video	• **CBS** (Reg. Programs) ■ 5.8 & 6.8 MN		• **The Sports Networ** 6.8 MN
3		**The Rock Christian Network**		**ABC** (Occasional) 6.2 & 6.8 MN		
4		• **Nickelodeon** (W) 6.8 MN		**ABC** (LA / NY Feed) 6.2 & 6.8 MN		**Global TV** (O/V) 6.8 MN
5		• **HSE** (Alternate) 6.8 MN		Occasional Video		Occasional Video
6		• **Madison Square Garden Biznet / Hughes Comm.**		**ABC** (Occasional) 6.2 & 6.8 MN	**Wold Communications Word Of Faith Sat. Network**	**Much Music Netwo** 5.41 & 6.2 DS
7		• **Liberty Broadcasting** 6.8 MN	Occasional Video	• **CBS** (Reg. Programs) ■ 6.2 & 6.8 MN		**CBC** (Labrador-Newfound 6.8 MN
8		**Playboy Private Ticket (S)**	Occasional Video		Occasional Video	**CHCH-TV** (Scramble (Hamilton, Ontario)
9		• **Sportsvision** 6.8 MN		• **Wold Satellite Network** 6.2 & 6.8 MN	**CTNA** Occasional Video	**WDIV-TV** (Scramble (Detroit)
10		• **American Movie Classics** • **Mid Atlantic/AWSN**	• **ABC** (Pacific Time Feed) 6.2 & 6.8 MN	• **ABC** (Reg. Programs) ■ 5.8 & 6.8 MN	**Word of Faith Sat. Network** Occasional Video	**WXYZ-TV** (Scramble (Detroit)
11		• **Home Sports Entertain.** (Houston) - 6.8 MN	**ABC** (O/V) 6.2 & 6.8 MN	Occasional Video	**Meadowlands Racing** (Scrambled)	• **CBC North** (Pacific 6.8 MN
12		• **Heartbeat Network Money Talks/NJT**		• **ABC** (Reg. Programs) ■ 5.8 & 6.8 MN	**AMSAT**-6.2 & 6.8 **Los Alamitos Horse Racing (S)**	
13	**NASA** (Contract Ch.) 6.8 MN	• **New England Sports Net.** 6.8 MN	Occasional Video	**Sports News Satellite** 10:15 PM & 1:00 AM (ET) Daily	**JISO** 6.2 & 6.8 MN	**SYNSAT / Hollywo** 6.8 MN
14		**Pratco's Shoppers Show** 6.8 MN	Occasional Video	**Independent Net.News** (NY) (O/V) - 6.2 MN	Occasional Video	**TCTV** (Scrambled) (Montreal)
15		**Country Club Shopping**	**CBS** (LA / NY Feed) 5.8 & 6.2 MN	**CBS** (Pacific Time Feed) 6.2 MN	• **PBS** (Schedule A) 6.8 MN	• **CBC** (French Chann 6.8 MN
16		**Cable Video Store** (Scrambled)	• **CBS** (Pacific Time Feed) 6.2 MN	Occasional Video	**CNN** (Contract Channel) **Turner Broadcasting** (O/V)	**CBC Parliament** (Fre **CBC North** (Pacific
17		Occasional Video	**CBS** (Toronto) Occasional Video	Occasional Video	• **PBS** (Schedule B) 6.8 MN	Occasional Video
18		**Hit Video USA** 5.94 & 6.8 MS		Occasional Video	**Los Alamitos Racing** (Scrambled)	**CITV - TV** (Scramble (Edmonton, Alberta
19		• **WPIX** (New York) 6.8 MN	**CBS** (Test Channel) 6.2 MN	Occasional Video	**International TV Network**	• **CBC North** (Atlanti 6.8 MN
20		• **Prime Ticket Network** ■ **FNN** (Alternate)	• **CBS** (Reg. Programs) ■ 6.2 MN	Occasional Video		• **CBMT** (Montreal) (English) - 6.8 MN
21		• **Nostalgia Channel** 6.8 MN	**P.E.N.** 6.8 MN		• **PBS** (Schedule C) 6.8 MN	**WTVS - TV** (Scrambl (Detroit)
22	**AFRTS** 6.8 MN	• **Home Team Sports** (Maryland - D.C.) - 6.8 MN	Occasional Video		Occasional Video	**BCTV** (Scrambled (Vancouver, B. C.
23		• **SportsChannel N.E.** Silent Network	Occasional Video	• **Wold Satellite Network** 6.2 & 6.8 MN	• **PBS** (Schedule D) (O/V) 6.8 MN	**WJBK** (Scrambled (Detroit)
24		• **The Playboy Channel** 6.8 MN	Occasional Video	Occasional Video	**Bonneville Satellite Corp.** 6.2 & 6.8 MN	**CBC Parliament** (Eng **CBC** (French Chann

Note: Satellite locations in parenthesis indicate that satellite's current position. In the near future, many of these will change to the new locations shown due to
DS = Discrete Stereo MS = Matrix Stereo MX = Multiplex Stereo MN = Monaural DT = Digital Stereo

Spacenet 2 - 69°	Galaxy 2 - 74°	Westar 2 - 79°	Westar 3 - 91°	Galaxy 3 - 93.5°	Morelos 1-113.5°	ASC 1-120	Aurora F5
16 Occasional Video	3 Meadows Racing	3 Occasional Video	5 CNN(Contract Ch.)	2 Turner Sports Net.	2 XHDF/XHIMT	3 Niteline TV Net.	6 Occasion
18 Occasional Video	5 Computer Dist. Net●	5 Occasional Video	19 Hughes Net.(O/V)	4 Occasional Video	4 KFMB ●	5 Occasional Video	13 NASA(Pa
20 Occasional Video	13 Occasional Video	11 Occasional Video	21 Brightstar (O/V)	5 Occasional Video	14 XEW-TV	11 NuStar Network	19 Occasion
	15 Occasional Video	15 Occasional Video		6 AG-DAY	20 Occasional Video	13 Occasional Video	21 Occasion
	16 Hughes(O/V)	19 Occasional Video		7 Tuscon Racing		15 Occasional Video	20 Learn A./
	17 Occasional Video			8 Occasional Video		17 Occasional Video	
	18 Indep.Sat.Net.(O/V)			9 Occasional Video		22 Occasional Video	
				10 Occasional Video			
				12 Biznet			
				17 Meadows Racing ●			

ervice Watch

• Services OnSat Carries

CTUATOR NUMBERS FOR EACH SATELLITE. ➔

	W5 124° W (122.5°) Westar 5	T3 126° W (125°) Telstar 303	F3 130° W (131°) Satcom F3R	G1 132° W (134°) Galaxy 1	F1 138° W (139°) Satcom F1R	W TRANS H/V
W acenet 1 *						
	NYRA (Scrambled) (New York Racing Authority)	• **Country Music TV** 6.8 MN / 5.58 & 5.76 DS	• **Nickelodeon** (E) 6.8 MN		Occasional Video	1
	University Network 6.2 & 6.8 MN	• **Selec - TV** 6.8 MN	• **Learning Channel** • **HSN** 2/4 PM-4AM (ET)	• **Nashville Network** 6.8 MN / 5.58 & 5.76 DS		2
neville Satellite Corp. 6.2 & 6.8 MN	**Group W Satellite Comm.** (Occasional)		• **Trinity Broadcasting Net.** 6.8 MN	• **WGN - TV** (Chicago) 6.8 MN	**Digital Radio**	3
Occasional Video			• **FNN / SCORE** 6.8 MN	• **Disney Channel** (E) 5.8 & 6.8 MS	**Netcom** (O/V) 6.2 & 6.8 MN	4
PPV (Scrambled) F.U.N. (Scrambled)	**Brightstar** (O/V) 6.2 & 6.8 MN	Occasional Video	**Viewer's Choice** Pay-Per-View (S)	• **Showtime** (E)-6.8 MN (Scrambled)	**Brazil TV Globo Network** Occasional Video	5
			• **TEMPO Television** 6.8 MN / 5.58 & 5.76 DS	• **Spanish Internat'al Net.** 6.8 MN		6
Occasional Video	**CBS** (Contract Channel) 6.2 & 6.8 MN		**ESPN** (Alternate Feed) 6.8 MN / 5.58 & 5.76 DS	• **CNN** -6.8 MN (Scrambled)	• **Prime Ticket Network** ■ **FNN** (Alternate)	7
	• **PASS** (Detroit) 6.8 MN	Occasional Video	• **CBN Cable Network** ■ 6.8 MN	**CNN Headline News** (Scrambled)	• **NBC** (Reg. Programs) 5.8 & 6.2 MS	8
ndependent Sat. TV 6.8 MN			• **USA Network** (W) 6.8 MN / 5.58 & 5.76 DS	• **ESPN** 6.8 MN / 5.58 & 5.76 DS	Occasional Video	9
			• **Showtime** (W)-6.8 MN (Scrambled)	• **TMC** (E)-5.8 & 6.8 MS (Scrambled)		10
ital Satellite Network (Scrambled)	**Group W Satellite Comm.** (Occasional)		• **Music TV** 5.8 & 6.62 MS	• **CBN Cable Network** ■ 6.8 MN	**WTN** (London to Australia TV)	11
			• **EWTN** -6.8MN Show/TMC Information	**Request Television** Pay-Per-View (S)	**Netcom** 6.2 & 6.8 MN	12
The Movie Network ekdays/8-11 PM (ET)			• **HBO** (W)-6.8 MN (Scrambled)	• **C - Span** 6.8 MN		13
	Occasional Video		**CNN** (Incoming Newsfeed) 6.2 & 6.8 MN	• **TMC** (W)-5.8 & 6.8 MS (Scrambled)		14
ACTS 6.8 MN	**TVSC** (Pittsburgh) Occasional Video		**Video Hits One (VH-1)** 6.8 MN / 7.4 Digital Stereo	**WOR - TV** (New Jersey) (Scrambled)	Occasional Video	15
SIN 6.2 & 6.8 MN	• **CSS** 6.8 MN		• **Home Theater Network** • **HSN** 2/4 AM-4PM (ET)	**TMC Test Channel** (Scrambled)		16
owtime-Tues/9 PM (ET) resight-Thur/9PM (ET)		Occasional Video	• **Lifetime** 6.8 MN	• **PTL Network** ■ 6.8 MN / 5.58 & 5.76 DS		17
Occasional Video	**TVSC** (Pittsburgh) (O/V) **Group W Satellite** (O/V)	• **Am. Extasy/MBC** STARTALK/FM America	**Spree TV Shopping** **Reuter's**	• **WTBS** (Atlanta) 5.58 & 5.76 DS	**NBC** (Pacific Time Feed) Occasional Video	18
Occasional Video			**C-SPAN 2** 6.8 MN	• **Cinemax** (E)-6.8 MN (Scrambled)	**Digital Radio** (NY) (NBC,CBS,RKO)	19
Occasional Video	**SYNSAT / Hollywood Penn Natl. Racing** (S)	**ABC** (Hawaii) Occasional Video	• **Black Entertainment TV** 6.8 MN / 5.58 & 5.76 DS	• **Galavision** 6.8 MN		20
aturday Night Sat. ace Station (Audio)	**Brightstar** ITN Newsfeed	**Telebet Pennsylvania** (Scrambled)	• **Weather Channel** 6.8 MN	• **USA Network** (E) 6.8 MN / 5.58 & 5.76 DS		21
	Taft Broadcasting Scrambling Info. Channel	• **KTVT** (Dallas - Ft. Worth) 6.8 MN	• **HSN 1** 6.2 & 6.8 MN	• **Discovery Channel** **Agrisat** - 6.8 MN	**HI-NET / Netcom** 6.2 & 6.8 MN	22
laywood Park Racing (Scrambled)			• **Cinemax** (W)-6.8 MN (Scrambled)	• **HBO** (E)-6.8 MN (Scrambled)	**Digital Radio** (NY) (ABC)	23
	Taft Broadcasting (Occasional Video)		• **Arts & Entertainment** 6.8 MN / 5.58 & 5.76 DS	• **Disney Channel** (W) 5.8 & 6.8 MS	**Radio Televisione Italiana** - 6.8 MN	24

ing requirement.

■ = Simulcast Services H = Horizontal V = Vertical (E) = East (W) = West (S) = Scrambled

*Vertical channels are 72 mhz bandwidth.

—Special Sports Feeds—

D (Anik D) - 1,2,4,11,13,15,19,20
I (Galaxy 1) - 3,9,12,15,18
2 (Galaxy 2) - 15,16,17,18
3 (Galaxy 3) - 2,4,6,8,9,11,12
(Satcom F1) - 5,8,9,11,18,20,24
(Satcom F2) - 5,20
(Satcom F3) - 7,9
(Satcom F4) - 1,5,6,9,11,13,14,18,19,20,21,22,24

S1 (Spacenet 1) - 7,9,13,19,23
T1 (Telstar 301) - 2,6,7,10,12,24
T2 (Telstar 302) - 10,15,16,17,19,23,24
T3 (Telstar 303) - 22
W2 (Westar 2) - 5,11,17,21
W3 (Westar 3) - 19,23
W4 (Westar 4) - 10,11,20
W5 (Westar 5) - 7,8,14,15,18,20,21,22,24

e Networks use Ku-band (12 GHz) and ground microwave relays for some transmissions.

KU-BAND ➔

RCA K2-81°W	GSTAR 1-103° W	Anik C3 - 117.5°
1 NBC (6.2/6.8 stereo)	4 Occasional Video	3 Occasional Video
2 Occasional Video	5 NTU (Nat.Tech.U.)	8 Knowledge Net(W)
5 NBC (6.2/6.8 stereo)	7 Occasional Video	9 Alberta Access(W)
6 Conus Washington	8 Occasional Video	12 Superchannel(W)
8 Conus/Hubcom	10 HI-NET Commun.	18 Atlantic Sat Net(E)
9 NBC (6.2/6.8 stereo)	12 HI-NET Commun.	19 Premier Choix(E)
11 NBC (6.2/6.8 stereo)	15 GTE Int.Teleconferencing	24 La Sette(E)
12 K2 ID Channel	16 HI-NET Commun.	26 TV Ontario(E)
13 NBC (6.2/6.8 stereo)		31 Superchannel(E)
15 NBC (6.2/6.8 stereo)		32 Radio Quebec(E)

VIDEO SERVICES

Pull out and save this page for future reference.

Service/Programming/Location	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat
ABC, Central/Network programming/T1, 10; T1, 12	8am-5am	8am-5am	8am-5am	8am-5am	8am-5am	8am-5am	8am-12am
ABC (Cosed Circuit/Pacific)/Pacific time zone programming/T2, 10	10am-2am	10am-7am	10am-7am	10am-7am	10am-7am	10am-7am	10am-2am
ABC (LA/NY)/Occasional network programming/T1,4	o/v	o/v	o/v	o/v	o/v	o/v	o/v
ABC (London)/Occasional network newsfeed/F1,11	o/v	o/v	o/v	o/v	o/v	o/v	o/v
ABC (o/v)/Occasional network programming/T1, 3, 6; T2, 11	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Alaska Sat.TV Project/Variety programming/F5, 24	7pm-12am	7pm-12am	7pm-12am	7pm-12am	7pm-12am	7pm-12am	7pm-12am
American Christian TV (ACTS)/Family programming/S1, 15	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
American Extasy/Ad-supported adult programming/T3, 18	11pm-4am	11pm-4am	11pm-4am	11pm-4am	11pm-4am	11pm-4am	11pm-4am
American Movie Classics/Movies (Golden Oldies)/F4, 10	7pm-6am	7pm-6am	7pm-6am	7pm-6am	7pm-6am	7pm-6am	7pm-6am
Armed Forces Radio-TV (AFRTS)/Indep. programming/F2, 22	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Arts & Entertainment TV/Cultural entertainment/F3, 24	8am-4am	8am-4am	8am-4am	8am-4am	8am-4am	8am-4am	8am-4am
Baptist Telecommunications Net.(BTN)/Religious prog.for churches(S)/S1, 21	11am-4pm	11am-4pm	11am-4pm	11am-4pm	11am-4pm	11am-4pm	11am-4pm
BCTV (Vancouver)/Independent programming (scrambled)/AD, 22	9am-5am	9am-5am	9am-5am	9am-5am	9am-5am	9am-5am	9am-5am
BizNet (American Business Network)/Financial News/F4,6; G3,12		7am-2pm	7am-2pm	7am-2pm	7am-2pm	7am-2pm	
Black Entertainment TV (BET)/Black-oriented shows/F3, 20	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Bonneville Telecommunications/News and sports/S1, 3; W4, 23	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Boresight/Satellite Industry news & information/S1, 17					9pm		
Bravo/Cultural entertainment/F4, 2	5pm-6am	8pm-6am	8pm-6am	8pm-6am	8pm-6am	8pm-6am	5pm-6am
Brightstar International News/Newscasts/W3, 21	o/v	o/v	o/v	o/v	o/v	o/v	o/v
CBC French (Eastern)/French-language network feeds/AD, 15	11am-3am	11am-3am	11am-3am	11am-3am	11am-3am	11am-3am	11am-3am
CBC North (Eastern)/English-language network feeds/AD, 19	8am-noon	8am-noon	8am-noon	8am-noon	8am-noon	8am-noon	8am-noon
CBC North (Pacific)/English-language network feeds/AD, 11	11am-3pm	11am-3pm	11am-3pm	11am-3pm	11am-3pm	11am-3pm	11am-3pm
CBC Parliamentary Network/House of Commons /AD, 16, 24	o/v	o/v	o/v	o/v	o/v	o/v	o/v
CBMT (Montreal)/English-language CBC affiliate/AD, 20	8am-2am	8am-2am	8am-2am	8am-2am	8am-2am	8am-2am	8am-2am
CBS (Central)/Network programming/T1, 2; T2, 20	10am-midnight	8am-5am	8am-5am	8am-5am	8am-5am	8am-5am	8am-midnight
CBS (LA/NY)/Occasional network programming/T2, 15	o/v	o/v	o/v	o/v	o/v	o/v	o/v
CBS (Pacific)/Pacific time zone network programming/T1, 15; T2, 16	noon-2am	10am-7am	10am-7am	10am-7am	10am-7am	10am-7am	10am-2am
CBS (Toronto)/Occasional network programming/T2, 17	o/v	o/v	o/v	o/v	o/v	o/v	o/v
CHCH (Hamilton)/Independent programming (scrambled)/AD, 8	6am-2am	6am-2am	6am-2am	6am-2am	6am-2am	6am-2am	6am-2am
Carribean Super Station/Various Programming/W5,16	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Catholic TV Network (CTNA)/Religious programming/W4, 20	1pm-4pm	1pm-4pm	1pm-4pm	1pm-4pm	1pm-4pm	1pm-4pm	1pm-4pm
CBN Cable Network/Family Entertainment/G1,11;F3,8	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Cinemax/Premium movies, sports & specials(scrambled)/G1, 19 (E); F3, 23 (W)	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
CITV (Edmonton)/Independent programming (scrambled)/AD, 18	8am-5am	8am-6am	8am-6am	8am-6am	8am-6am	8am-6am	8am-6am
CNN (Cable News Network)/News & features/G1, 7; W3, 5	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
CNN Headline News/Continuous updated news/G1, 8	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
C.O.M.B./Value Network/Shop at home/F4, 2	12pm-5pm	2pm-8pm	2pm-8pm	2pm-8pm	2pm-8pm	2pm-8pm	12pm-5pm
Computer Distribution Network/Computer news and information/G2,5		2:45 pm	2:45 pm	2:45 pm	2:45 pm	2:45 pm	
Country Music Television (CMTV)/Country music videos/T3, 1	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
C-Span/Live coverage of House of Representatives/G1, 13; F3, 19	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Discovery Channel/science & educational programming/G1, 22	3pm-3am	3pm-3am	3pm-3am	3pm-3am	3pm-3am	3pm-3am	3pm-3am
Disney Channel/Premium family entertainment/G1, 4 (E), 24 (W)	6am-1am	6am-1am	6am-1am	6am-1am	6am-1am	6am-1am	6am-1am
ESPN/Sports programming/G1, 9	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Eternal Word TV Network (EWTN)/Catholic family programming/F3, 12	8pm-12am	8pm-12am	8pm-12am	8pm-12am	8pm-12am	8pm-12am	8pm-12am
Fantasy Unrestricted Network(FUN)/Adult programs(scrambled)S1,5	12am-6am	12am-6am	12am-6am	12am-6am	12am-6am	12am-6am	12am-6am
Financial News Network(FNN)/Financial News/F3,4	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Galavision/Spanish-language programming/G1,20	11am-4am	4pm-4am	4pm-4am	4pm-4am	4pm-4am	4pm-4am	11am-4am
Heartbeat Network/Religious programming/F4, 12	6am-8pm	6am-8pm	6am-8pm	6am-8pm	6am-8pm	6am-8pm	6am-8pm
HiNet(Netcom International)/Occasional news&sports/F1,12,22	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Hit Video USA/Music videos & concerts/F4,18	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Home Box Office/Premium movies and specials(scrambled)G1,23(E);F3,13(W)	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Home Shopping Network 1 and 2/Home Shopping Club/F3, 22; F4, 1	24 hours	21 hours	21 hours	21 hours	21 hours	21 hours	24 hours
Home Sports Entertainment (HSE)/Southwest sports/F4, 11, 14	6pm-1am	6pm-1am	6pm-1am	6pm-1am	6pm-1am	6pm-1am	6pm-1am
Home Team Sports (HTS)/Wash. DC-area sports/F4, 22	6pm-1am	6pm-1am	6pm-1am	6pm-1am	6pm-1am	6pm-1am	6pm-1am
Home Theater Network (HTN)/Premium movies & specials/F3, 16	4pm-4am	4pm-4am	4pm-4am	4pm-4am	4pm-4am	4pm-4am	4pm-4am
Hospital Sat. Network (HSN)/Medical prog. & movies (scrambled)/S1, 11	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Independent Satellite TV Network/General programming/S1,1	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Japanese International Satellite Organization (JISO)/Newsfeed/W4, 13	o/v	o/v	o/v	o/v	o/v	o/v	o/v
KTVT (Dallas)/Independent network programming/T3, 22	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Learn- Alaska Television Network/Educational prog./F5, 24	8am-11pm	8am-11pm	8am-11pm	8am-11pm	8am-11pm	8am-11pm	8am-11pm
The Learning Channel (TLC)/Educational prog. and courses/F3, 2	6am-4pm	6am-4pm	6am-4pm	6am-4pm	6am-4pm	6am-4pm	6am-4pm
Liberty Broadcasting/Religious programming/F4,7	8am-3pm	8am-3pm	8am-3pm	8am-3pm	8am-3pm	8am-3pm	8am-3pm
Lifetime/Health and self-help programming/F3, 17	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Madison Square Garden (MSG)/ Sports and syndicated programs/F4, 6	2pm-4am	7pm-4am	7pm-4am	7pm-4am	7pm-4am	7pm-4am	2pm-4am
Maryland Horse Racing/Occasional horse racing (scrambled)/F1, 13	o/v	o/v	o/v	o/v	o/v	o/v	o/v
The Meadows Racing Network/Harness racing/G3,17	7pm-11pm					7pm-11pm	7pm-11pm
Mid-Atlantic program service/specials/F4, 10			6pm-7pm				
The Movie Channel (TMC)/Premium movies & specials (S)/G1, 10 (E), 14 (W)	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
The Movie Network/TVRO supported movie service/S1, 13		8pm-11pm	8pm-11pm	8pm-11pm	8pm-11pm	8pm-11pm	
Much Music Network/Music videos and concerts/AD, 6	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Music Television (MTV)/Music videos and news/F3, 11	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
NASA Contract Channel/Live NASA mission coverage/F2, 13	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
The Nashville Network (TNN)/Country videos and programs/G1, 2	9am-3am	9am-3am	9am-3am	9am-3am	9am-3am	9am-3am	9am-3am
National Jewish Television (NJT)/Jewish family programming/F3, 18	1pm-4pm						
NBC (Central)/Network programming/F1, 8	noon-1am	6am-2am	6am-2am	6am-2am	6am-2am	6am-2am	8am-1am
New England Sports Network (NESN)/Occasional regional sports/F4, 13	o/v	o/v	o/v	o/v	o/v	o/v	o/v
New York Racing Authority (NYRA)/ Live horse racing (scrambled)/W5, 1	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Nickelodeon/Pre-school to teenage entertainment/F3, 1 (E); F4, 4 (W)	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Niteline TV Network/Religious programming/ASC 1, 3	o/v	o/v	o/v	o/v	o/v	o/v	o/v
The Nostalgia Channel/Vintage movies & variety shows/F4, 21	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Nustar Broadcasting Network/Various Programming/ASC 1, 11	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours

VIDEO SERVICES

Pull out and save this page for future reference.

Service/Programming/Location	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Open-Net/N. Carolina public affairs service/F3, 14					8pm-10pm		
Penn National Racing/Occas. live horse racing(scrambled)W5,20	o/v	o/v	o/v	o/v	o/v	o/v	o/v
The People's Choice/Pay-per-view programming/F4,8	o/v	o/v	o/v	o/v	o/v	o/v	o/v
PTL Satellite Network/Christian family programming/G1,17	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
The Playboy Channel/Adult programming/F4,24	8pm-6am	8pm-6am	8pm-6am	8pm-6am	8pm-6am	8pm-6am	8pm-6am
The Playboy Private Ticket/Adult programming/F4,8	o/v	o/v	o/v	o/v	o/v	o/v	o/v
PPV Channel/Pay-per-view movies, sports & adult programming/S1,5	9pm-until	9pm-until	9pm-until	9pm-until	9pm-until	9pm-until	9pm-until
Pratco's Shopper's Showcase/Shop at home show/F4,14		8pm-10pm	8pm-10pm	8pm-10pm	8pm-10pm	8pm-10pm	
Prime Ticket Network/LA regional sports coverage/F4, 20; F1/7	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Pro Am Sports System (PASS)/Detroit regional sports/W5,8	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Public Broadcasting System (PBS)/Eastern programming/W4,15	9am-2am	10am-2am	10am-2am	10am-2am	10am-2am	10am-2am	8am-12am
Public Broadcasting System (PBS)/Central programming/W4,17	noon-4am	8am-1am	8am-1am	8am-1am	8am-1am	8am-1am	9am-11pm
Public Broadcasting System (PBS)/Mountain programming/W4,21	8am-3am	8am-3am	8am-3am	8am-3am	8am-3am	8am-3am	8am-3am
Public Broadcasting System (PBS)/Pacific programming/W4,23	10pm-11pm	11am-noon	11am-noon	11am-noon	11am-noon	11am-noon	
Radio Televisione Italiana/Italian news and sports/F1,24	2pm-3pm	2pm-3pm	2pm-3pm	2pm-3pm	2pm-3pm	2pm-3pm	2pm-3pm
Request Television/Pay-per-view programming/G1,12	9am-5am	9am-5am	9am-5am	9am-5am	9am-5am	9am-5am	9am-5am
Reuter Monitor Service/News & investment text (scrambled)/F3, 18		4am-8pm	4am-8pm	4am-8pm	4am-8pm	4am-8pm	
The Rock Christian Network/Religious programming/F4,3	o/v	o/v	o/v	o/v	o/v	o/v	o/v
SelecTV/Premium movies and adult features/T3, 2	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Showtime/Premium movies, sports and specials (S)/G1, 5 (E); F3, 10 (W)	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
The Silent Network/Programming in sign language and voice/F4, 8							10am-12pm
Satellite/Showtime/News of industry, features, trade show coverage/S1, 17			9pm-10pm	noon-1pm			
Spanish International Network (SIN)/Spanish programming/G1, 6	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
The Sports Network (TSN)/Canadian and American sports/AD, 2	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
SportsChannel(New England)/Regional sports coverage/F4,23	8pm-2am	8pm-2am	8pm-2am	8pm-2am	8pm-2am	8pm-2am	8p-2am
SportsVision/Chicago regional sports coverage/F4, 9	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Synsat/Hollywood/Occasional advance network programming/AD,13; W5,20	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Taft Broadcasting/Occasional Syndicated programming feeds/W5, 22, 24	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Telemedia Communication TV(TCTV)/French TVA prog.(scrambled)/AD, 14	8am-1am	8am-1am	8am-1am	8am-1am	8am-1am	8am-1am	8am-1am
TeleBet Pennsylvania/Occasional live horse racing (scrambled)/D4, 21	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Tempo Television/Variety entertainment/F3, 6	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hour
Trinity Broadcasting Network (TBN)/Christian family programming/F3, 3	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
TVSC (Pittsburgh)/Occasional syndicated programming feeds/W5,15,18	o/v	o/v	o/v	o/v	o/v	o/v	o/v
USA Blackout Network/Substitute programming for blackouts/F3, 22	o/v	o/v	o/v	o/v	o/v	o/v	o/v
USA Network/Sports and various entertainment/F3, 9(W); G1, 1(E)	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
The University Network (The Unchannel)/Dr. Gene Scott/W5, 2	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
VHA (Voluntary Hospitals of America)/Various programming/S1, 13	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Video Hits One (VH-1)/Music videos aimed at 18-49 age group/F3, 15	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Viewer's Choice/Pay-per-view programming/F3, 5	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
WDIV (Detroit)/NBC and independent programming (scrambled)/AD, 9	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
The Weather Channel/Live national weather service/F3, 21	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
WGN (Chicago)/Independent network programming/G1, 3	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
WJBK (Detroit)/CBS and independent programming (scrambled)/AD, 23	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Wold Comm./Occas. network & sports programming/T1, 9, 23; W4, 6, 11	o/v	o/v	o/v	o/v	o/v	o/v	o/v
Word of Faith Satellite Network/Christian family programming/W4, 6	o/v	o/v	o/v	o/v	o/v	o/v	o/v
WOR (New York)/Independent network programming (Scrambled)/G1, 15	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
WPIX (New York)/Independent network programming/F4, 19	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
WTBS (Atlanta)/Independent network programming/G1, 18	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
WTVS (Detroit)/PBS and independent programming (scrambled)/AD, 21	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
WXYZ (Detroit)/ABC and independent programming (scrambled)/AD, 10	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours

AUDIO SERVICES

Note: In order to receive some audio subcarriers, your receiver needs a narrow band selector switch.

All audio services listed below are 24 hours a day except where noted.

Adult Contemporary (Tempo Sound)/Traditional MOR (5.58/5.76 DS)/F3, 6
AFRTS Radio Network/News,sports & network feeds (5.94 MN)/F2, 22
Album Tracks(Studioline)/Hit album selections(5.22/5.40 DS)/F3,19
All That Jazz (Studioline)/Big band and jazz music (5.94/6.12 DS)F3,19
Big Bands (Tempo Sounds)/Big Band era music (7.785 MN)/F3, 6
Cable Jazz Network (Starship)/Jazz music (5.94/6.12 DS)/F3, 8
Cable Radio Network/News, music & prog. hilites (5.8 MN)/W5, 2
CBBK-FM (Kingston)/English CBC-Eastern (5.76/5.94 DS)/AD, 16, 24
CBM-AM (Montreal)/CBC programming (6.12 MN)/AD, 20
CBOF-FM/English CBC programming(5.76/5.94 DS)/AD,16, 24
CBU-FM/English CBC programming(5.76/5.94 DS)/AD,22
CFRB-AM(Toronto)/MOR contemporary music(7.875 MN)/AD,4
CHFI-FM(Toronto)/MOR-beautiful music (6.8 MN)/AD,8
CIRK-FM(Edmonton)/Progressive rock(6.17 MX)/AD,18
CITE-FM(Montreal)/French MOR music (6.17 MN)/AD,14
CKAC-AM(Montreal)/French MOR music (5.41 MN)/AD,14
CKO-FM(Toronto)/News and information (6.17 MN)/AD,8
CKRW-AM(Whitehorse, Yukon)/Country & western (5.41 MN)/AD,23
Comedy Specials (Tempo Sound)/Comedy and specials (7.695 MN)/F3,6
Contemporary Music Via Satellite/Background music (5.0 MN)/W5,18
Country Coast to Coast/Modern country music (5.94/6.12 DS)/G1,3
Country-Western (Tempo Sound)/Country-western music (5.40/5.94 DS)/F3,6
CNN Radio Network/News updates (6.3 MN)/G1,7; F1,3; F3,14
Dallas Taping for the Blind/Reading service for the blind (6.2 MN)/F4, 21
Easy Listening/Background music (6.2 MN & 6.5 MN)/W5,18
50's, 60's and 70's (Tempo Sound)/Top 40 music (6.435 MN)/F3,6
FM America/Easy music&live call-in TVRO show daily at 9 pm ET(6.2 MN)/T3, 18
Gold Mine Radio Network/Country & Western classics (7.92 MN)/F4,23
Greek Network, The/Greek language news, music & sports (7.335 MN)/F4, 23
InStore Satellite Network/Background music (5.4/5.8 DS & 7.38/7.74 DS)/T3, 18
In Touch Network/Reading service for the blind (7.875 MN)/F3, 6
Italian Network, The/Italian language news, music & sports (7.425 MN)/G1, 15
KRBE-FM(Houston)/Pop-rock music during HSE billboard (6.8 MN)/F4,11
Lifestyle (Seeburg)/Easy listening music (7.695 MN)/G1,3
Lifestyle AC (Seeburg)/Adult contemporary music (8.145 MN)/G1, 15
Love Sounds (Tempo Sound)/Contemporary Christian music (6.30/6.48 DS)/F3, 8
Moody Broadcasting Network/Christian prog. (5.40/7.92 DS)/G1, 3
Music by Muzak/Background music (5.58 MN)/W5, 18
National Museum of Broadcast Radio/Old radio shows & music (6.2 MN)/F4, 21
Nice & Easy (Tempo Sound)/Easy listening music (5.58/5.76 DS)/F3, 6
Rock Sounds/Top 40 rock music (5.4 MN)/W5, 18
Rock Channel, The (Tempo Sound)/Upbeat top 40 rock (7.37/7.56 DS)/F3, 6
Rythmix (Studioline)/Adult contemporary dance music (5.58/5.76 DS)/F3, 19
Satellite Jazz Network/Jazz programming from KKGO, LA (5.58/5.76 DS)/F3, 4
Satellite Music Network/Country Music (7.56/7.92 DS)/F4, 7
Satellite Music Network/Easy listening (7.38/7.56 DS)/G1, 3
Satellite Radio Net./Gospel music & ministries (6.2 MN)/F3, 2
Sheridan Broadcasting Net./MOR, news & sports (7.38/7.56 DS)/W5, 18
Specials (Studioline)/Specials and variety music (6.3/6.48 DS)/F3, 19
Stardust/MOR from 1940s to 80s (8.055/8.145 DS)/G1, 3
Starstation/Adult Contemporary (5.58/5.76 DS)/G1, 3
StarTalk Network/24 hour talk network (5.94 MN)/T3, 18
StudioLine/Country music (7.0 MN) & Rock music (7.5 MN)/G1, 13
Transtar II/Country music (5.58/5.76 DS)/T1, 9
Transtar III/Adult contemporary music (7.38/7.56 DS)/T1, 9
WFMT-FM(Chicago)/Classical music (6.3/6.48 DS)/G1,3
WJIB-FM(Boston)/Easy listening during NESN billboard (6.8 MN)/F4, 21
WQXR-FM(New York)/Classical music (6.3/6.48 DS)/G1, 15

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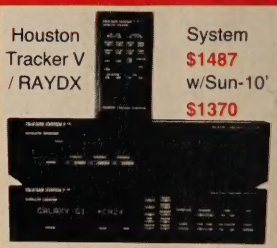

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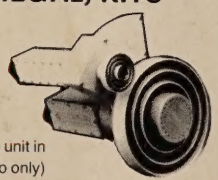

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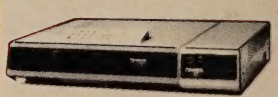

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